



The background of the cover is a photograph of a vast, icy landscape. In the foreground, a large, smooth, white ice formation curves across the frame. In the middle ground, several jagged, vertical icebergs rise from the water. The sky is filled with heavy, grey clouds, with a bright patch of light visible in the upper right corner. The overall mood is cold and majestic.

NEW THINKINGS ABOUT ART MUSEUM DESIGN

FINNISH MODERN ART MUSEUM DESIGN

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Master Thesis

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Lastly, a special thanks to my parents for all their understanding and dedication through my life.

ABSTRACT

Unlike any other structure, the museum is a singular building type, a coveted commission for an architect. Among which, the art museum design is invariably the most architecturally interesting buildings that attract both innovative architects and the public.

All kinds of industries are advancing at a staggering speed in present-day society. So do the museum design, which keeps changing to cater to the visitors and artists. To start with, this thesis work retrospects the development of museum architecture, and then through the case studies of the museum masterpieces, the new design trends of contemporary museum are summarized.

To practice the 'rules', a site in the in the Eteläsatama (South Harbor) area of Helsinki is chosen for a new modern art museum. A comprehensive analysis and design work are then proposed. The museum would exert a powerful influence over its context, providing social and urban regeneration in an area poised between the established city and the historic docks.

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01 / BACKGROUND

1.1 Exhibition Space in Embryo

Present organization and design of exhibition space are affected by the early trade fair and private collection room. As was found in the third century BC, the most famous museum in Rome was only for an academy of scholars with a collection of specific objects. More broadly, various treasures, which had looted during Roman conquests, were displayed in the baths and the forums. While at the same age, the Greece temples housed precious paintings, statues and other objects for the use of votive offerings.



Figure 1.1.1 Ole Worm's Museum, Copenhagen, 1655

A collector's collection. The private collector of natural history specimens and curiosities, with display and storage based on classification.

1.2 Development of Museum Space

In the medieval Europe, it was the church that stored up metals, jewels and religious relics in high value. While in the 16th century, the Italian galleria developed into the main spaces for the exhibition of painting and sculpture. Not until late seventeenth century, a few museums started to open their doors to a selected public, among which being the Ashmolean at Oxford and Tower of London. Later decades witnessed the debut of several museum master pieces—museums in Vatican founded in the middle 18th century, the British museum established in 1753 and the Louvre Paris in 1793 (Hall 1987).



Figure 1.2.1 Vatican Museum

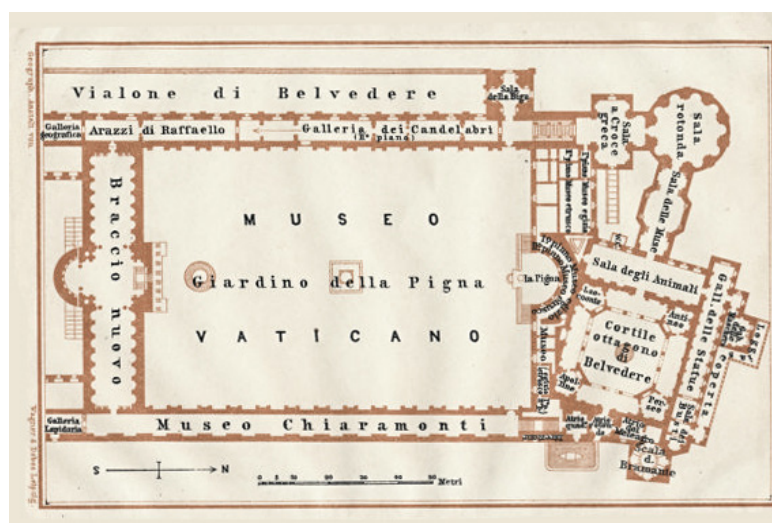


Figure 1.2.2 Vatican Museum Floor Plan, 1909



Figure 1.2.3 The Zoological Gallery, British Museum, Holborn, London, 1845

The room is crowded with cases and exhibits, with only the central aisle clear.

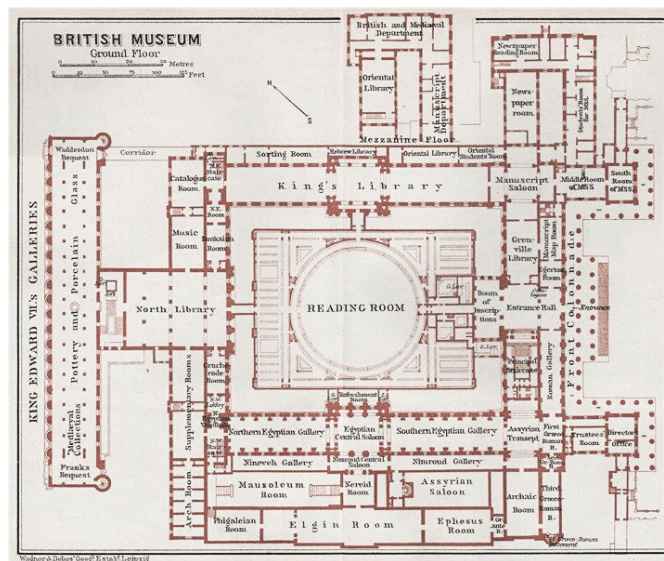


Figure 1.2.4 British Museum Ground Floor Plan, London, 1930

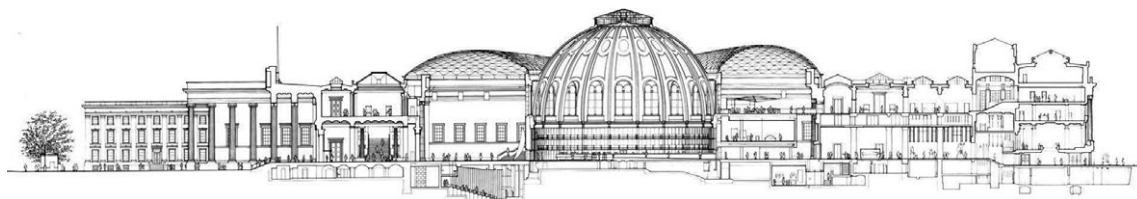


Figure 1.2.5 British Museum Longitudinal Section Plan

PLAN OF THE CRYSTAL PALACE

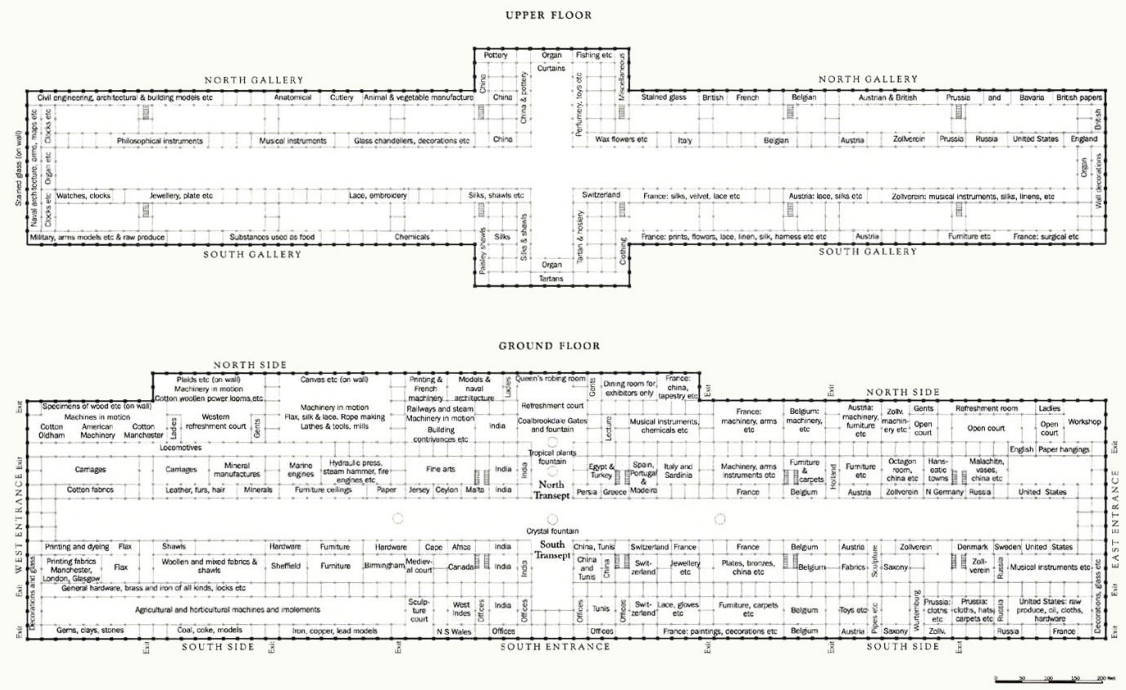


Figure 1.2.6 Plan of the Crystal Palace, 1851

The floor plan is rigid and symmetrical with a wide promenade, and showcases were rigorously arranged based on the taxonomic grid layout.

Along with the rapid progress of the human society on a myriad of fronts, the function of museum also changed significantly. Money was invested to build modern museums aiming at the demonstration of national artistry to the edification of the general public. The common features of these museums are: rigid and symmetrical floor plan, rows of skylights, a wide promenade and showcases were rigorously arranged based on the taxonomic grid layout.

In parallel with the development of the museum building, the other forms of exhibition space had laid a compound effect on today's design concepts. For instance, the Great Exhibition of 1851, which started the tradition of World Fairs. Especially the exhibition building—Crystal Palace, ushered the experiment in the vanguard of architecture and design ever since. Though still following the rigid grid plan, the EXPO 1851 had already started the test in the prefabrication of standardized construction parts. Moreover, it was regarded as the milestone of great-improved accessibility to the art and science for the general public.



Figure 1.2.7 Exterior of the Crystal Palace, 1851



Figure 1.2.8 Interior of the Crystal Palace, 1851

1.3 Evolution of Modern Museum

With the successive avant-garde movements in the early twentieth century, the past was proclaimed to dead. Le Corbusier's unrealized proposal Museum Unlimited Growth (La Musée à croissance illimitée, 1939) was the best illustration of the new visions at that phrase. Following the pursuit of unlimited growth, he proposed a bold scheme with a square spiral on the piloti, incrementally extending along with its collection. Despite of the clarity in form of order-less, the flexible display space and performance space for artists were considered as the sensitive elements of the museum.

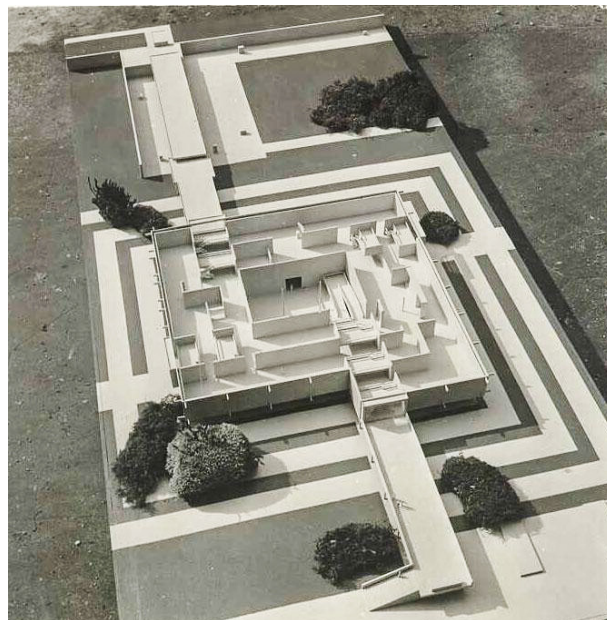
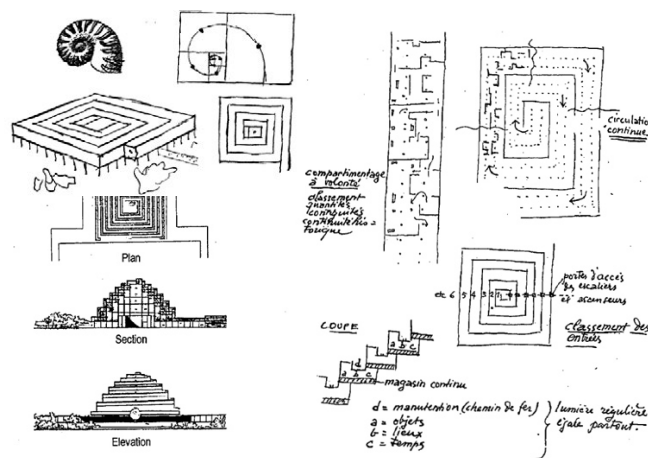


Figure 1.3.1 (above) Design Concept of Museum Unlimited Growth
Figure 1.3.2 (below) Model of Museum Unlimited Growth

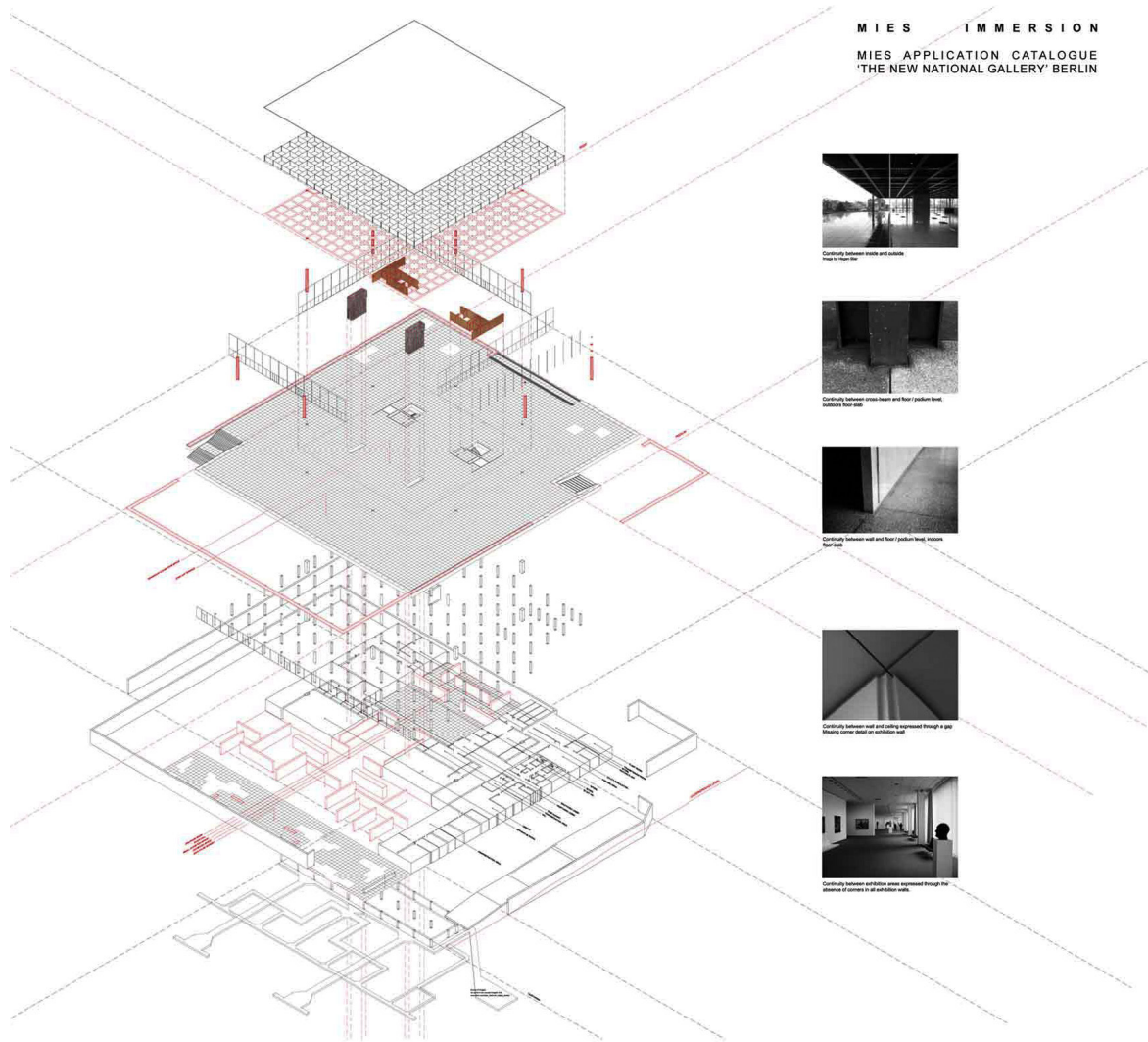


Figure 1.3.3 New National Gallery, Berlin

Exploded axonometric showing the gradual dissolution of special boundaries vertically along the building, in plan and details.

The next leap created by Mies van der Rohe. His masterpiece New National Gallery (Neue Nationalgalerie, 1968) in Berlin is considered as a hinge from the closed exhibition rooms into a flowing open-plan. Minimal in shape, yet detailed in structure, raised the new tide of terse and radical design style (Henderson 1998).



Figure 1.3.4 (above)
Elevation Photo of Pompidou Centre

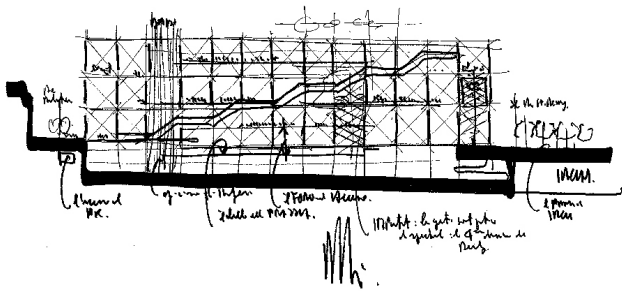
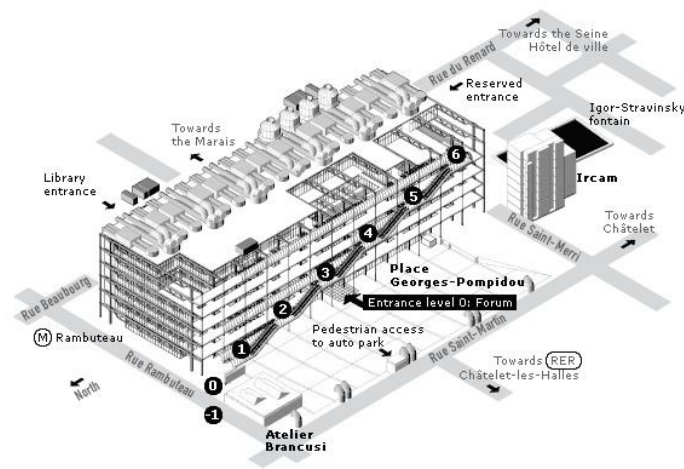


Figure 1.3.5 (middle)
Initial sketch of Pompidou Centre

Figure 1.3.6 (below)
Building Diagram of Pompidou Centre



As is criticized as competing with the collection inside, the Centre Georges Pompidou (1977), by Renzo Piano and Richard Rogers, successfully retextualized the old city square as a new monument of Paris. With an inside-out machine-like looking, all the mechanical structures—exposed piping and whimsical escalators maximized the interior space without interruptions. And the sloping plaza outside became a popular gathering place for street musicians and jugglers. In terms of functions, it adopted a more complex arrangement with large open interior gallery, a huge public library and IRCAM music and acoustic research center. By blending high-tech solutions into urbanism, it wipes away outmoded precedent with new ideology and futuristic perceptions.

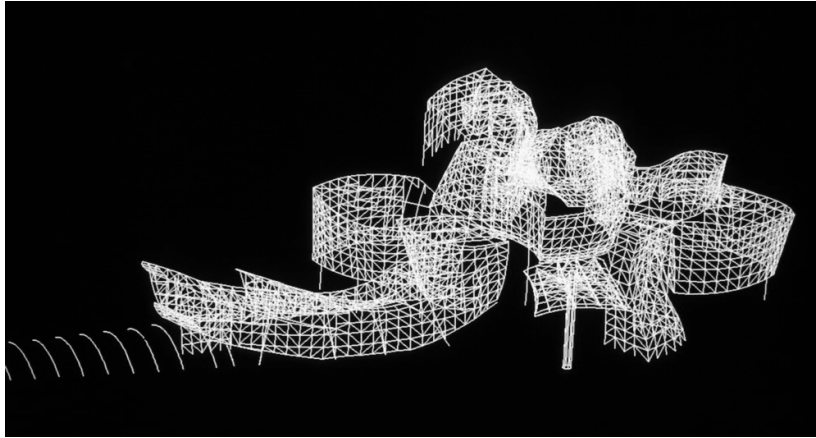


Figure 1.3.7 CATIA Aided in the Creation of Guggenheim Museum Bilbao



Figure 1.3.8 Completed Guggenheim Museum Bilbao

Frank Gehry's design for Guggenheim Museum Bilbao (1997) is an overturning creation for the whole world. Through the swirling forms of the titanium blossom, the museum drastically transformed the local life in this industrial city with an expressionist gesture. To achieve the spectacular building skin, CATIA (3D design software) was utilized to aid the complex design work and calculations, and each surface panel is cut exclusive to its location.



Figure 1.3.9 Interior of Guggenheim Museum Bilbao

Besides, the socio-economic effect of the museum has been astonishing. The profit it generated in the first three years including the taxes collected from the chain business substantially exceeded the building cost itself. Although this “Bilbao effect” has been denounced as a symbol of cultural imperialism and gentrification or the Bilbao anomaly—“for the iconic chemistry between the design of building, its image and the public turns out to be rather rare” (Rybczynski 2008), it is undeniable that this museum triggered the construction boom in iconic building globally.

02 / MODERN MUSEUMS AND BEYOND

2.1 “New Museum”

In present-day society, many of the classical museums are considered as outdated building antiques, as described by critic Jayne Merkel, “Museums, like the other public buildings at that time, were built into the classical style, the so called palace architecture—grand, classical and horizontal” (Merkel 2002). Nevertheless, the basic programmatic traits like atriums, naturally lit galleries and courtyards etc., were all derived from the era of classical museum. While on the other hand, modern museums are constantly keeping its inherent feature of change for endless possibilities.



Figure 2.1.1 Grand Atrium with Natural Light, Natural History Museum, London



Figure 2.1.2 Courtyard of the Morikami Museum, Florida

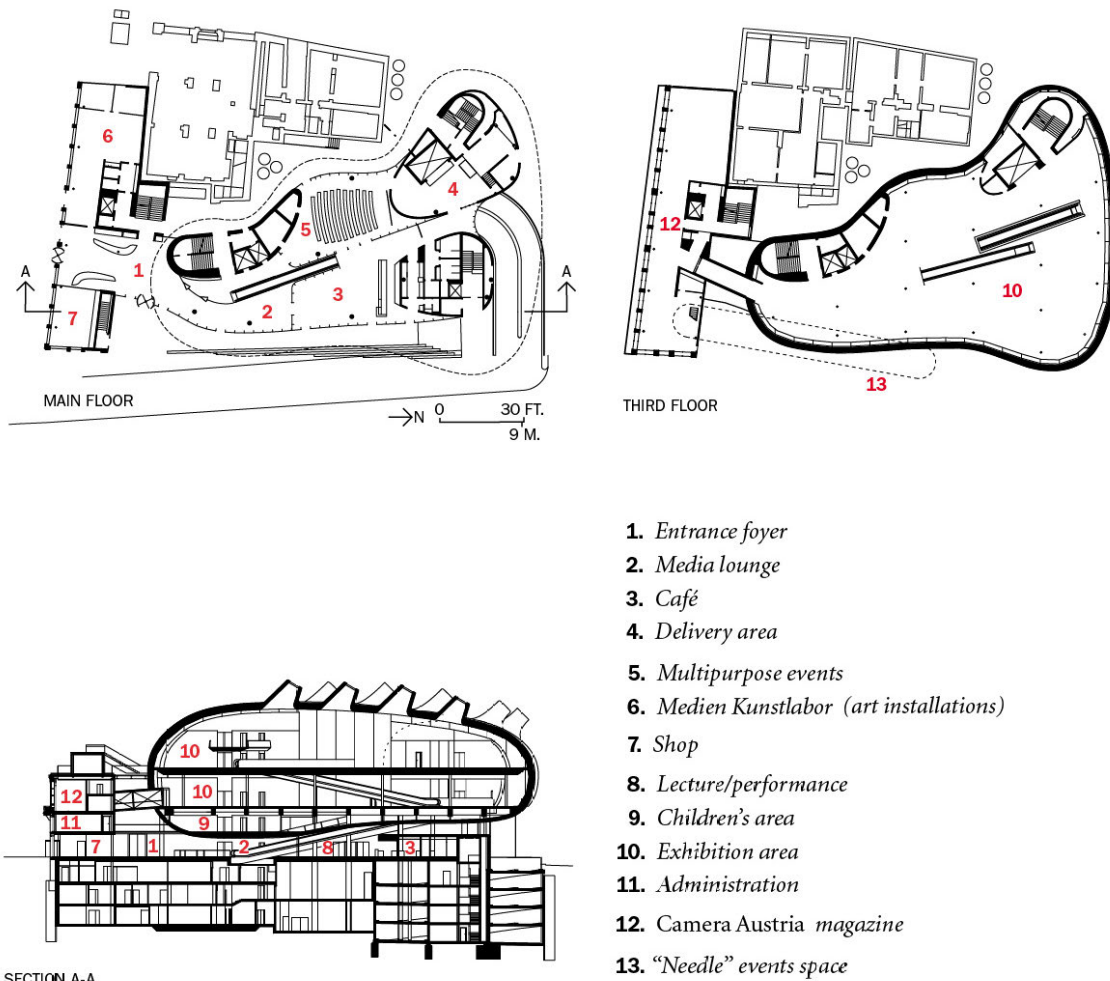


Figure 2.1.3 Floor Plan and Section Plan of Kunsthau Graz, Austria

With the rapid updating of information and the fast development of the transport industry, some "new museums" are freed from the burden of collection storage, such as Kunsthau Graz by Peter Cook. The museum functions as a pit stop along the endless globetrotting of exhibits, where they shipped in, displayed, and then delivered to the next destination.

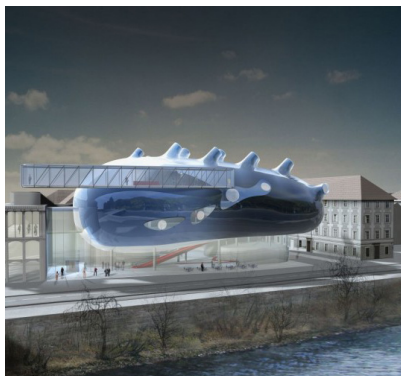


Figure 2.1.4 Perspective of Kunsthau Graz

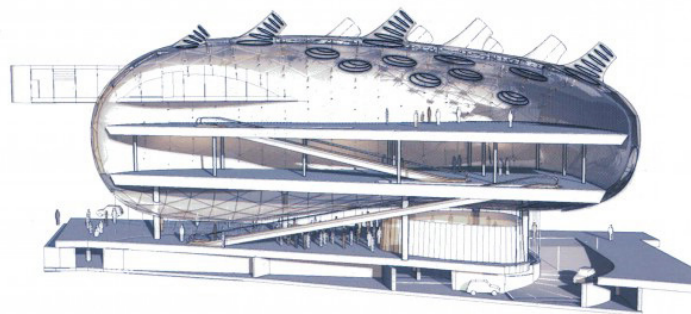


Figure 2.1.5 Section Study of Kunsthau Graz

2.2 Flexibility

The high mobility and diversity of the exhibition result in the new challenge of the museum system—flexibility. The New Museum by SANAA (New York City) comprises seven boxes with various proportions to hold different exhibitions and supportive functions. And the architecture creates a relationship between its form and its surroundings. The slimmer and taller mass refined from the original plan is to respond the architectural landscape of the city.

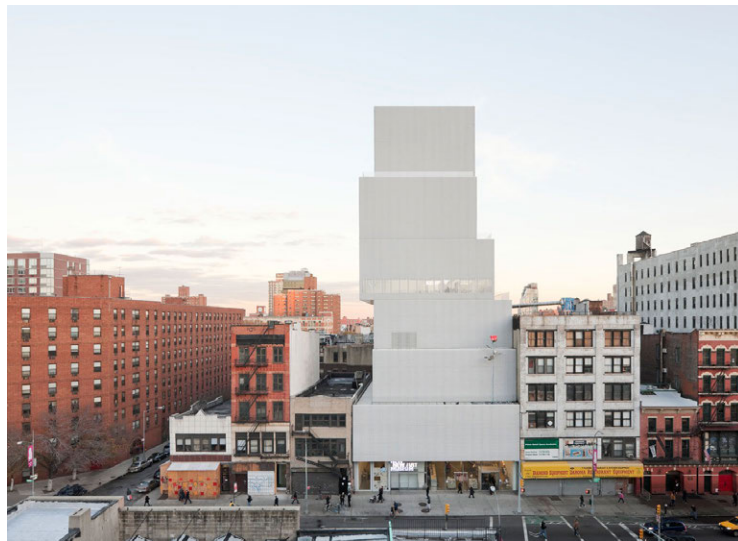


Figure 2.2.1 New Museum by SANAA, New York City

2.3 Service Consumption

Another crucial influence factor of the evolution of museum is the consumerism. “Throughout Junkspace old aura is transfused with new luster to spawn sudden commercial viability,” claims by Koolhaas (Koolhaas 2001). Sprouted from the cheap printing postcards and tourist souvenirs, this “fad” for museums to link the high and low culture with exhibition momentos spreads widely in museums all over the world. The newly spawning MOMA outlet is a case in point. The same emphasis on the museum restaurant is irresistible. Not only in the modern museums like Louisiana Museum (Denmark), but the classical museums like the Louvre as well, table service or take-away is a necessity. And sometimes even more attractive propaganda than its art collection.



Figure 2.3.1 MOMA Design Store, New York City



Figure 2.3.2 Louisiana Museum Café, Humlebæk, Denmark

2.4 Diversity

Described by the terms: Junkspace, tourism generator or retail brand, the new museum seems to be shaped as a bleak and weary product. Nonetheless, from a different angle of view, as the former vice director of the Metropolitan Museum of Art, Arthur Rosenblatt said, “Today, museums are busier and more exciting and attractive. Museums are making art available to more and more people.” (Zeiger 2005)

This trend is more obvious embodied by Steven Holl’s Bellevue Arts Museum. Apart from the exhibition part, education facilities are taken into account. Following the museum’s motto, “See, Explore, Make Art”, new programs like ceramic studios, community classrooms, library and artist-in –residence studios, is added to build a non-dialectic openness of experience. And the central atrium worked as a ‘social condenser’, collects various community activities rather than the inanition of Junkspace.



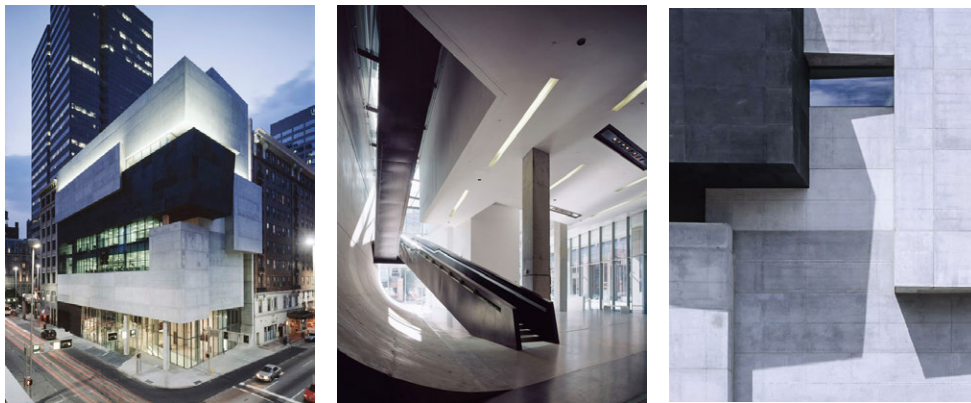
Figure 2.4.1 Bellevue Arts Museum by Steven Holl

2.5 Urban Link

More than community center, museum now is emphasized as civic pavilion. This point is best illustrated by the design of Rosenthal Center for Contemporary Art. The design is purposed from the street. The sidewalk outside is rolled elegantly into the rear wall inside, as the 'urban carpet' that invites visitors. And the stone-like façade displays the diversity of the city life with forms, colors and materials picking from the surrounding context. The experience of traversing the ramp like stairs introduces a familiar feel of meet the rush from the bustling street. Overall, it's a museum, a civic structure that blends architecture, art and daily life.



Figure 2.5.1 Design Sketches for Rosenthal Center for Contemporary Art



(from left to right)

Figure 2.5.2 Street View of Rosenthal Center for Contemporary Art, Cincinnati

Figure 2.5.3 'Urban Carpet' Space

Figure 2.5.4 Stone-Like Façade

2.6 Interplay

Similarly, in Richard Serra's sculpture *Snake*, the line between art and experience is blurring. As viewers wandering around the *Snake*, their routes are shifted unexpectedly and a dizzying sensation of steel and space is provoked in motion. In the museum architecture, the interplay between the space and visitors is taking a pivotal role in the design nowadays.



Figure 2.6.1 Sculpture by Richard Serra

The concept of Spiraling Museum (by BIG) is rooted from this standpoint. Embedded in the landscape, the spiraling glass pavilion guides visitors on a narrative journey. The spiral shape links the galleries and workshops together; therefore, the art and science is brought to life in the form of time telling.



Figure 2.6.2 Spiraling Museum Winter View

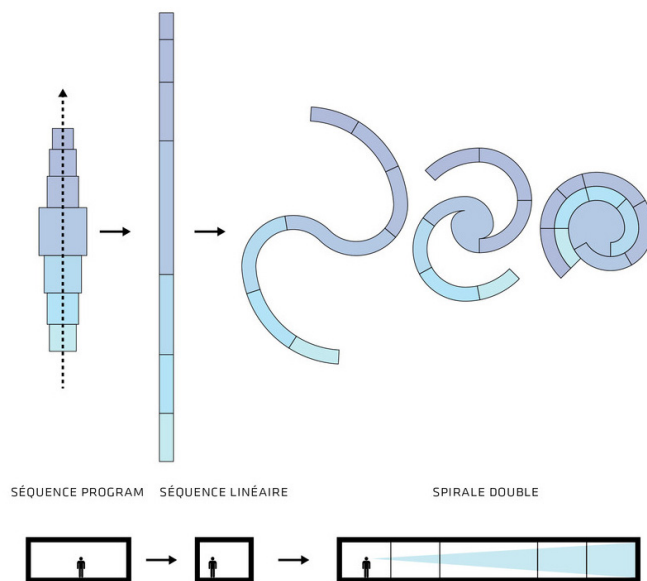


Figure 2.6.3 (left) Concept

The exhibition sequence is stretched into a linear continuous special experience. The sequence is bended into a continues spiral.

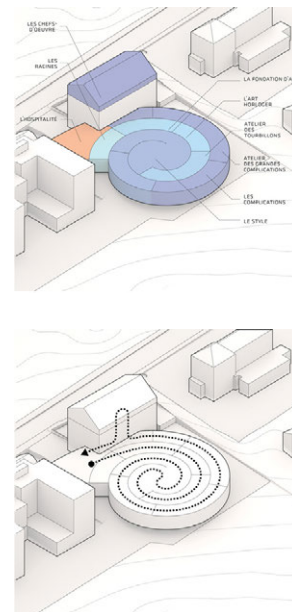


Figure 2.6.4 (upper right) Exhibition Sequence

The exhibition sequence is positioned in front of the existing museum building with the original workshops. The entrance hall connects the existing buildings and connects the exhibition with the hospitality program.

Figure 2.6.5 (lower right) Exhibition Route

The exhibition route connects the new spiral with the existing museum building.

03 / MUSEUM CULTURE IN FINLAND

3.1 General Situation

Finland (Suomi), located in the northern Europe, occupies 338,440 km² in area. Finland's population is 5.5 million (2014), and the majority of the population is concentrated in the southern region (Finland in the EU 2016).

Finland is a member of the Nordic social welfare nations, which keep the tradition of high attention to the needs for a comprehensive system of public cultural facilities, such as museums, galleries, libraries, theatres, concert houses etc. Hence, great efforts are laid on the promotion of easy access to public cultural services. Simultaneously, the autonomous right for artists and their works is recognized and safeguarded by law and government policies. In a nutshell, the principal rule in the Finnish cultural environment is cultural democratization.

Under this circumstance, over 1,000 museums are spread in Finland. The Ethnographic Museum—the first museum in Finland is established by the University of Helsinki in 1840, and others opened across the country thereafter. The Finns love of culture and history is quite noticeable from the numerous museums and galleries run in every city and town.



Figure 3.1.1 Famous Finnish Designer Eero Aarnio with His Artworks



Figure 3.1.2 Helsinki Design Week Children's Weekend

3.2 Varied Typologies

One third of the museums in Finland are professionally run. And the local museums are actively engaged in the public events. Museums run by professional museum workers (Types of museums 2016):

Cultural history museums 49 %

Specialized museums 26 %

Art museums 18 %

Natural history museums 4 %

Combination museums 3 %



Figure 3.2.1 (left) National Museum of Finland, Helsinki



Figure 3.2.2 (right) Vintage Finnish Storage Buildings at the Seurasaari Open-Air Museum, Helsinki

The National Museum of Finland (Kansallismuseo) is the typical one among cultural history museums. Housed in a Finnish National Romantic style building, the museum itself is a part of the National Board of Antiquities.

Seurasaari Open-Air Museum is a unique one among those specialized museums. Cottages, farmsteads and manors of the past four centuries from all around Finland are relocated in a tranquil island. The traditional Finnish way of life is displayed lively around visitors to fulfill people's curiosities about the old times in Finland.



*Figure 3.2.3 (left) Kiasma Museum of Contemporary Art by Steven Holl Architects
Figure 3.2.4 (right) Arktikum House in Rovaniemi*

Kiasma—Museum of Contemporary Art by Steven Holl Architects is undoubtedly the representative of the art museums. Sited in the ragged seam of the inner city and early 20th century's suburb area, the goal is to bind the disparate fabrics together. The crisscrossing mass is liberally defined from its Finnish meaning 'chiasma'— the two crossing strings of DNA. The glass blocks on the concave surface constitute the gentle curving form, and the elevations made of solid zinc, titanium and copper become pieces of constructive urban art.

Arktikum House in Rovaniemi is a popular cultural venue, which accommodates a museum, science center and venue for conferences. Visitors are guided by stimulating exhibitions on an adventure to Lapland and the Arctic region. Old stories about the superstitions of the Eurasian elk and the brown bear are described by the real experience scenes. And the Arctic Centre's research findings are revealed in an interactive approach.

3.3 Aim and Objective

Since became the capital city of Finland around two hundred years, currently Helsinki has embarked on a wide range of actions to promote the greatest urban transformation at both the state and local levels. Based on this ambitious plan of renewal and development, a new Finnish modern art museum is proposed, as a new internationally recognized symbol of Helsinki, to provide a powerful breakthrough of the comprehensive display of Finnish art.

Benefiting from the neoclassical center exemplified by Eliel Saarinen and Alvar Aalto, the new museum is envisioned to establish a remarkable profile for the organization and display of the internationally significant artworks while specializing in Nordic art as well. By fusing the great architecture and contemporary art, the building would serve its functions mainly for exhibitions, art incubator, experiencing venue and artwork fair. Beyond the museum walls, a museum lab, featured by openness and public engagement, would extend the art life further.



Figure 3.3.1 Helsinki Aerial View

04 / SITE ANALYSIS

4.1 City

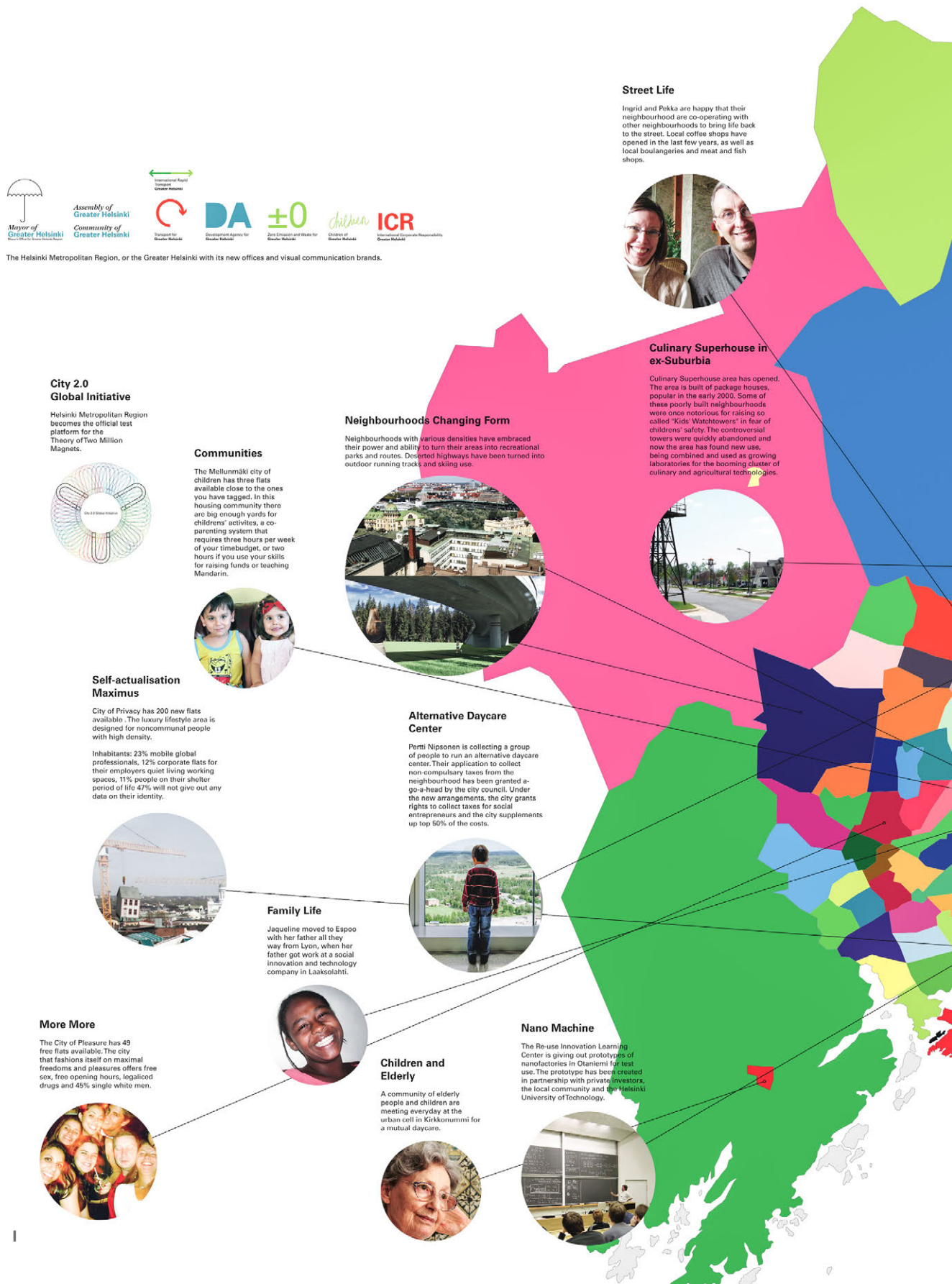
Standing at the very intersection of East and West, Helsinki is a crucial vector in the region of Gulf of Finland Growth Triangle. With the metropolitan population of over 1.4 million, it is the most populous municipality and urban area in Finland (Helsinki 2016). Its appetite for innovation, enviable education system, entrepreneurial spirit, and success in international happiness indices set Helsinki an excellent example for cities worldwide (Malcolm Reading Consultants 2014).

A goal-oriented future view is described in Helsinki City Plan Vision 2050. The core strategy is to plan the city in human scale and the urban space to be fun and pleasant to live in. Special attention is given to the greenway (pedestrian and cyclist) and public transport and its proximity to the sea and green areas. Currently, a couple of urban renewal projects are on the agenda, for instance, the old industrial and harbor areas in Kalasatama and Jätkäsaari are planned to be transformed new commercial and residential district. Meanwhile, specialized districts are planned to cluster the excellent factors in art and culture, such as the ongoing Helsinki Central Library.



Figure 4.1.1 Helsinki Location

Figure 4.1.4 A Day of Superdiversity



The Ala-Malmi citizens decided that their neighbourhood would reduce parking spaces and make them into public parks. The citizens were also to demolish old apartments to build new, zero emission targeting buildings, to ensure better energy efficiency and further tax cuts.



Nina opened up with her friends a design community in Järvenpää center, near the abandoned shopping mall. She says the public transport is convenient in the area and that she can enjoy superhigh-speed communication networks vital for her when keeping in contact with her global clients.



Milla from Martinkallio is really happy that her neighbourhood decided to help young street artists and have a loose regulation on street cleaning. Everybody takes their trash home, but we leave all the cool stuff on the street for everybody to see, she says proudly. Milla's friends have all decided to move to Kallio because of the relaxed and supporting atmosphere.



The densest areas in HMR open a working hub for social entrepreneurs, open 24/7. It is one of the 500 hubs born out of a International Corporate Responsibility Programme.

Book facilities: Table, room, soundsystem, screening room, kitchen, sauna, printers, and more.

Book social production tools: HMRWiki, funding advice, personal development, community building workshop.

ICR
International Corporate Responsibility
Greater Helsinki

40% of the Finnish population will live within the Greater Helsinki. This area has a substantially higher GDP compared to the surrounding nation-states.

40%

Mayor Rantanen wishes everybody welcome to Helsinki, the innovation capital. While having coffee near her office in Aviapolis, she announces a new metropolitan strategy for her coming term. She promises that the dreams and miracles of Helsinki will continue.



Today is the open city! In city centres, all the government offices and buildings, private clubs, galleries, gyms, and so forth, are open and free of charge, both public and private. This is part of the Mayor's Social Capital Building project.



Distributed home services available now
with 15 minutes radius:

Sauna
(5 people, 5 euros/hour, 7 carbon credits)
Home cinema and bar
(7 people, 2 euros/hour+films, 1 carbon credit)
Spa
(3 people, 7 euros/hour, 25 carbon credits)
Cold storage
(250 cubic meters, 3 euros/year/meters, +1 carbon credit)
Warm storage
(79 cubic meters, 3 euros/year/meters, 3 carbon credit)

New super-efficient power windmills have been erected to the regional waterfronts in order to reach the Zero Emission Town goal.



Ludmilla from Kivenlahti is happy that her neighbourhood has opened up more fashion outlets. More young people are moving into the area, which gives a nice diversity to the area, she says.



The Public Transportation Agency invests in a new, zero emission and higher durability bus fleet, ready to serve within this week.



Toölönkatu has established itself as a cheese street.



The local, high dense Environmental Charge has been raised from 3 euros/kilometer to 5 euros/kilometer as of today. The areas that include are regions and neighbourhoods south of Länsiväylä expressway, Tapiola and Katajanokka.



Maglev trains to St Petersburg and Beijing leaving at 15:49. Arrival in St Petersburg at 16:35, Beijing 15 hrs later. You can book tickets now.



Punavuori of Helsinki became the first community of geography that reached the Zero Emission Town goal.



4.2 Site and Surroundings

The design site is located in Eteläsatama of Helsinki, the apex where the grids of urban blocks and harbor structure meets. With the great historical and cultural significance, this urban space is regarded as the symbolic city gateway from the sea. Adjacent to Esplanadi--the central park of Helsinki, the harbor is famous for its lively Market Square.

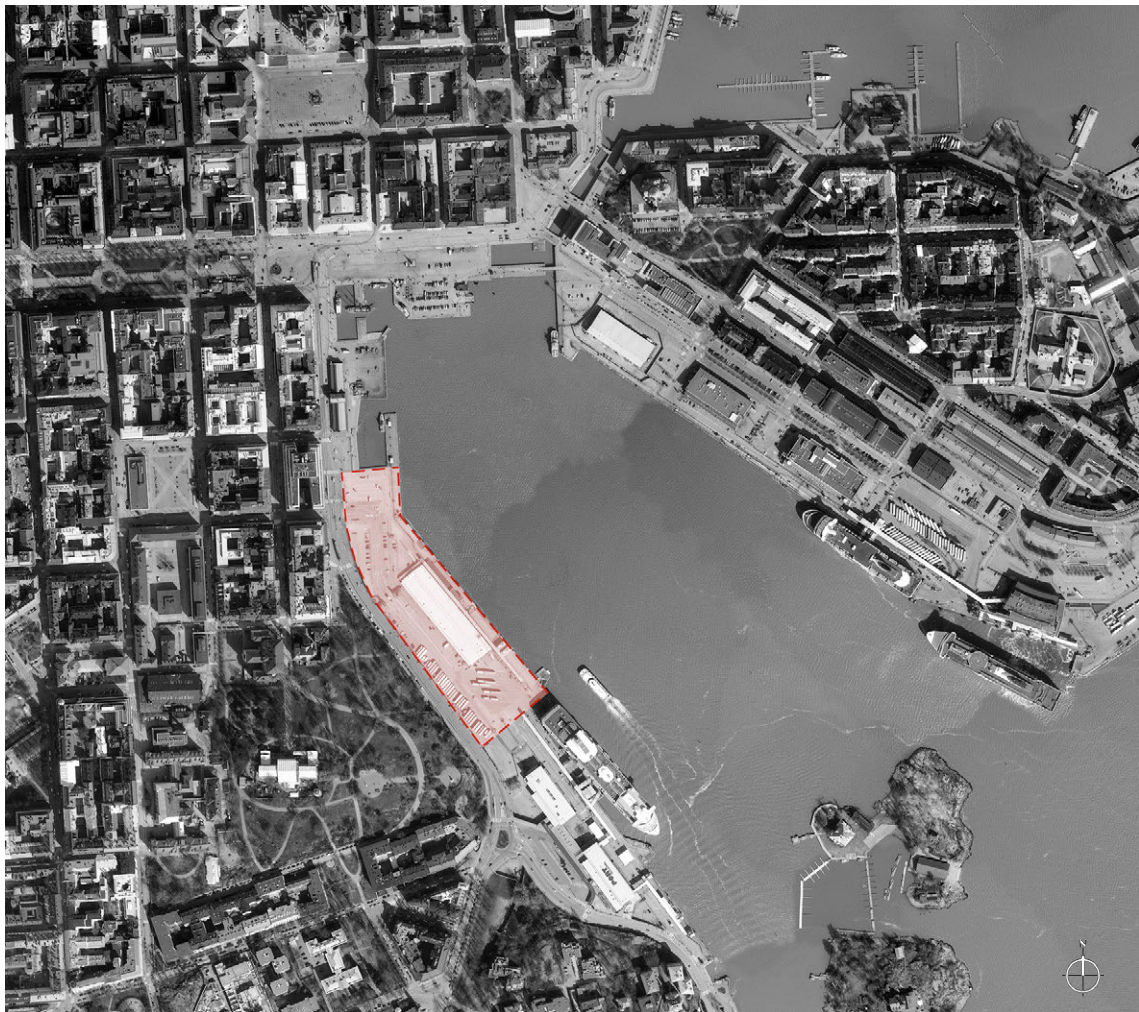


Figure 4.2.1 Aerial view of the South Harbor
Red Area Indicates the Design Site



Figure 4.2.2 Grids of Urban Blocks and Harbor Structure Meets

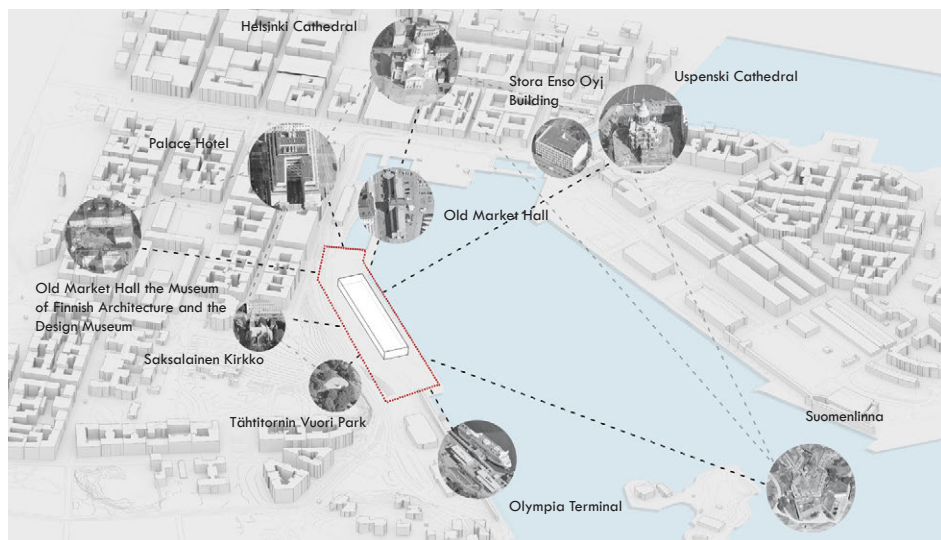


Figure 4.2.3 Important Buildings in the Surrounding



Figure 4.2.4 View of Design Site



Adjacent neighborhoods offer ample designated historic and natural landmarks, including, from the north, Helsinki Cathedral, Stora Enso Oy Building, Uspenski Cathedral, Old Market Hall, and the Palace Hotel (1952), and to the south, Tähtitornin Vuori Park and Olympia Terminal. Also the site is highly visible from surrounding waterfront, approaching water traffic and the hilltop park. And the new museum would be remarkable scenery from the windows of City Hall, Presidential Palace, the Supreme Court, and the Swedish Embassy.

Five blocks further from the design site, there sits the Museum of Finnish Architecture and the Design Museum. The geographical proximity provides possibility that the three museums together form a renascent art and cultural zone of the South Harbor.

One of the main working ports of Helsinki is located in the immediate south of the site, including the Olympia Terminal (1952). The port is functioned as passenger and vehicular ferries to destinations like Estonia and Sweden. However, the proposed museum will replace part of areas operated by the port.



Figure 4.2.5 View of Makasiini Terminal from Tahtitornin Vuori Park



Figure 4.2.6 View of Makasiini Terminal



Figure 4.2.7 View of Design Site from Market Square



4.3 Climatic and Ground Conditions



Figure 4.3.1 Panoramic Winter View of the South Harbor, Helsinki

Influencing by the country's geographical position, Finland's climate is characterized by maritime and continental climate. The site experiences stronger winds and air humidity is higher than inland. Moreover, freezing and thawing place requires high demands on the durability of building materials and structures. And because of the latitude, around the winter solstice, days last around 5 and a half hours with very low sun degree (about 6 degrees at noon), and the overcast weather at this time of year accentuates the darkness. Conversely, Helsinki enjoys long daylight in summer, around nineteen hours during the summer solstice days.



The quayside area is approximately +2.5 meters above sea level. The ground component within the site is mainly clay and infill. The bottom layer is sand, moraine and bedrock (at about -22 meters), upper layer is clay (from -10 meters to -19 meters), and the infill layer is on the top to a depth of -10 meters (Malcolm Reading Consultants 2014).

In average, the sea level is approximately +0.2 meters, with a variation between +0.8 to -0.2 meters. However, the highest level announced was +1.7 meters in 2005. Hence, the City of Helsinki recommends a ground-floor slab should be set in the waterfront building at +3.1 meters (Malcolm Reading Consultants 2014).

4.4 Site Function Plan

Nowadays, museum-visiting is not only a sightseeing experience, but more like a discovery journey to satisfy curiosities. Not limited to the traditional functions with galleries, art storage, registrar, conservation, curatorial office etc., as a public building, a number of public uses should be included: multi-functional auditorium, artists' atelier, library, design market, sauna, restaurant, retail etc. And more importantly, they are not the auxiliary space, instead, existing as the new blood and veins of modern museum architecture.

To gain more first-hand experiences, there is also public space equipped with all kinds of tools for creation and amusement. In terms of artists, ateliers and art factory provide freedom and convenience to achieve their art pursuits. And the incubator helps to bridge the buried ideas with their economic outputs and social contribution.



Figure 4.4.1 Site Function Plan



Figure 4.4.2 Museum Galleries



Figure 4.4.3 Multi-functional Auditorium



Figure 4.4.4 Artists' Atelier



Figure 4.4.5 Art Workshop



Figure 4.4.6 Museum Library



Figure 4.4.7 Design Market



Figure 4.4.8 Museum Café



Figure 4.4.9 Museum Store



Figure 4.4.10 Museum Restaurant



Figure 4.4.11 Museum Sauna

4.5 Site and Users

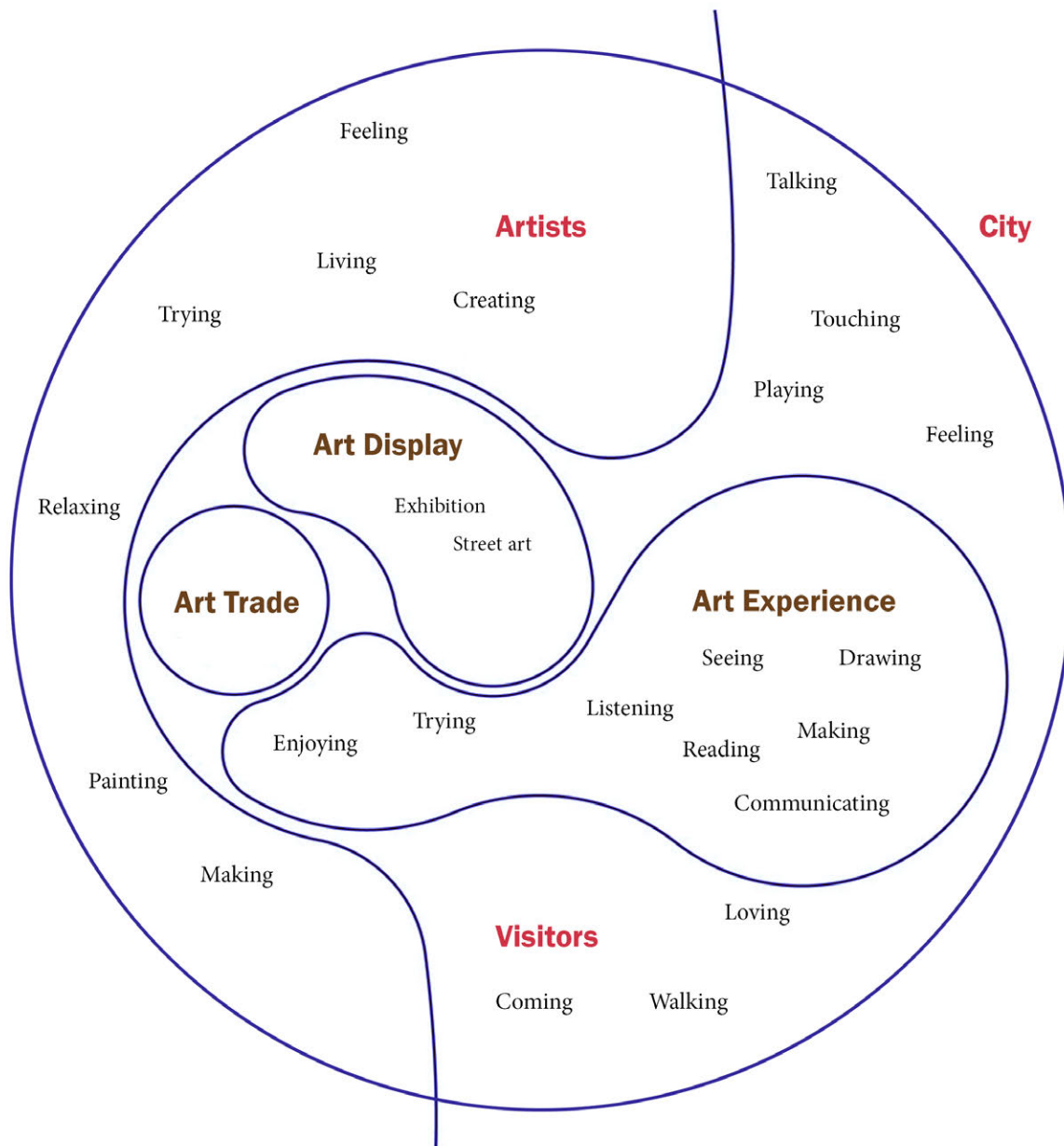


Figure 4.5.1 Site and Users of the Museum

Visitors, artists and the city play the essential roles of the whole experience. Through the activities which in forms of exhibition, market, and even create a piece of artwork by oneself, the building becomes engaging and memorable which will resonate with citizens and tourists.

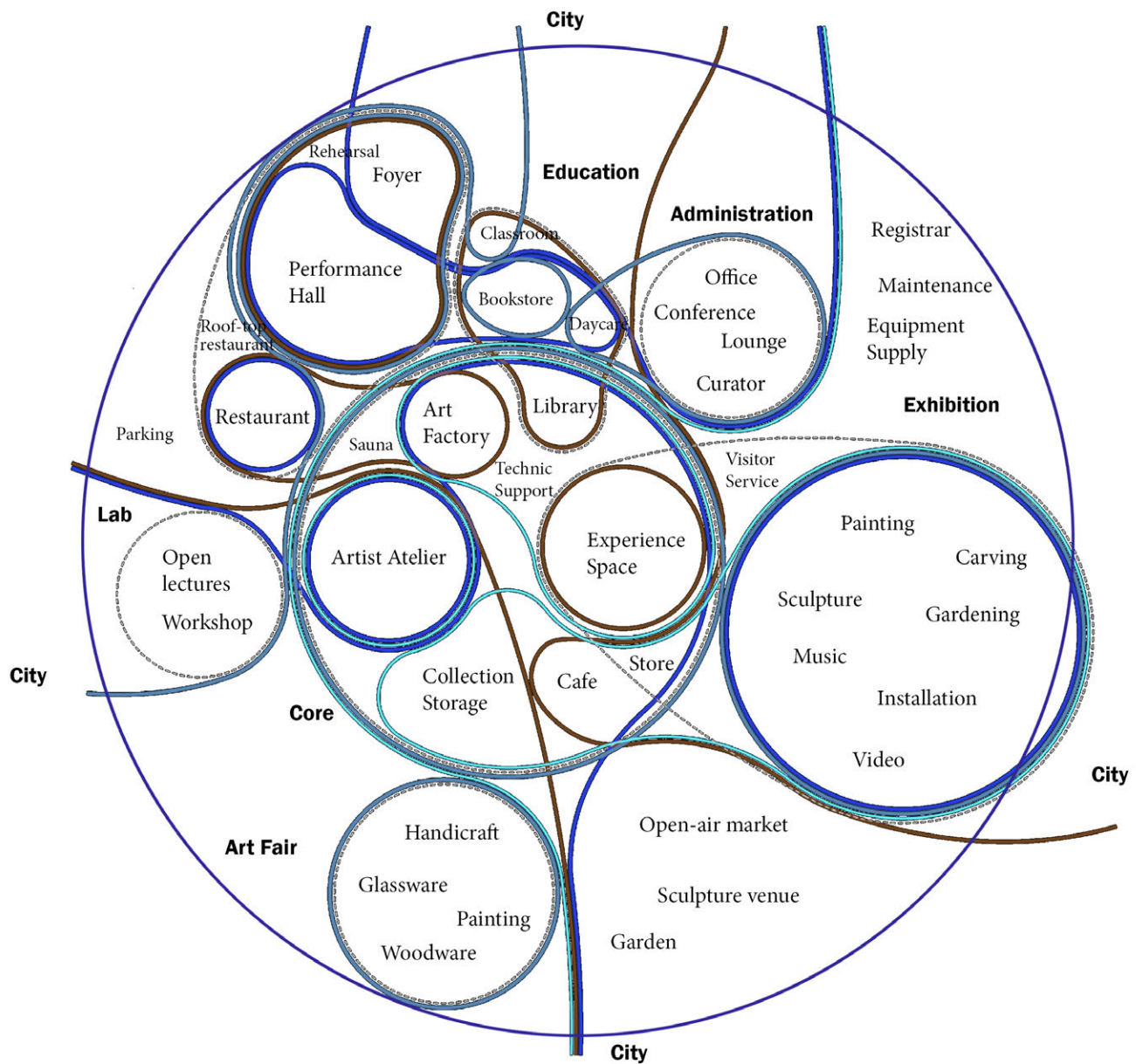


Figure 4.5.2 Function Diversity of the Museum

What's more, the experience and relationship also extend beyond the museum wall, from the lab, open-air market and sculpture venue, where one is able to get the fresh artistic breath outside.

4.6 Area Schedule

FUNCTION NAME	AREA SIZE (m ²)	NOTES
Exhibition	4,871	
Exhibition Galleries	4,871	Flexible spaces, fully wired
Performance Center	629	
Flexible Performance Hall	316	
Foyer	138	Incl. locker and toilet
Rehearsal Hall	32	
Dressing Rooms	41	
Green Room	31	
Projection Booth	37	
Simultaneous Translation Booth	13	
Technican Office	21	
Multi-purpose Zone	2,860	
Atrium	1,172	Flexible usages
Art Experience Space	1,404	Incl. music studio and toilet
Museum Lab	180	Incl. office and toilet
Multifunction Classroom	104	Suitable for all media
Art Incubator	1,103	
Artist Atelier	806	Incl. meeting room, kitchenette
Art Factory	297	Incl. material loading deck
Library	611	
Reading Room	318	
Workshop Space	119	
Office	174	
Visitor Services	572	
Visitor Screening	100	Incl. queuing area
Coat Check/Lockers	253	Incl. queuing area
Ticketing and Information Desk	139	
Daycare Room	80	Incl. storage
Sky Sauna	458	
Reception Desk	42	
Lounge Area with Fireplace	176	
Dressing Rooms	40	men's and women's
Shower Rooms	60	lbid
Sauna	82	lbid
Toilets	58	lbid

Retail	2,780	
Museum Store	357	Museum-related and design merchandise
Design Market	2,256	
Bookstore	167	
Dining	1,117	
Cafe	370	
Museum Restaurant	479	
Kitchen	268	Serving staff lunch also
Offices	580	
Administrative Office	110	
Curatorial Office	20	
Exhibition Design	53	
Archivist Office	25	
Marketing Office	24	
Conference Room	59	
Shared Work Room	136	
Fitness Room	85	
Staff Lunch Room	68	
Collections Storage and Management	350	
Art Storage	100	Short-term storage only
Shipping/Receiving	50	
Crate Storage	50	
Uncrating/Staging	50	
Shared Art Prep and Conservation Studio	70	
Registrar & Tech Offices	30	
Maintenance and Operations	369	
IT Server	76	Incl. workroom and staff offices
Equipment	76	Incl. supply and seasonal furniture storage
Maintenance	117	Incl. custodial office and control room
New Makasiini Terminal	293	
Waiting Area	238	
Ticket Desk	55	
Outdoor Space	5,679	
Garden	230	
Roof Terrace	427	Used by restaurant
Sculpture Venue	5,022	Incl. open-air market
Total Gross Floor Area	16,593	
Site Area	33,899	
Building Volume	96,000	m ³

05 / DESIGN

5.1 Concept

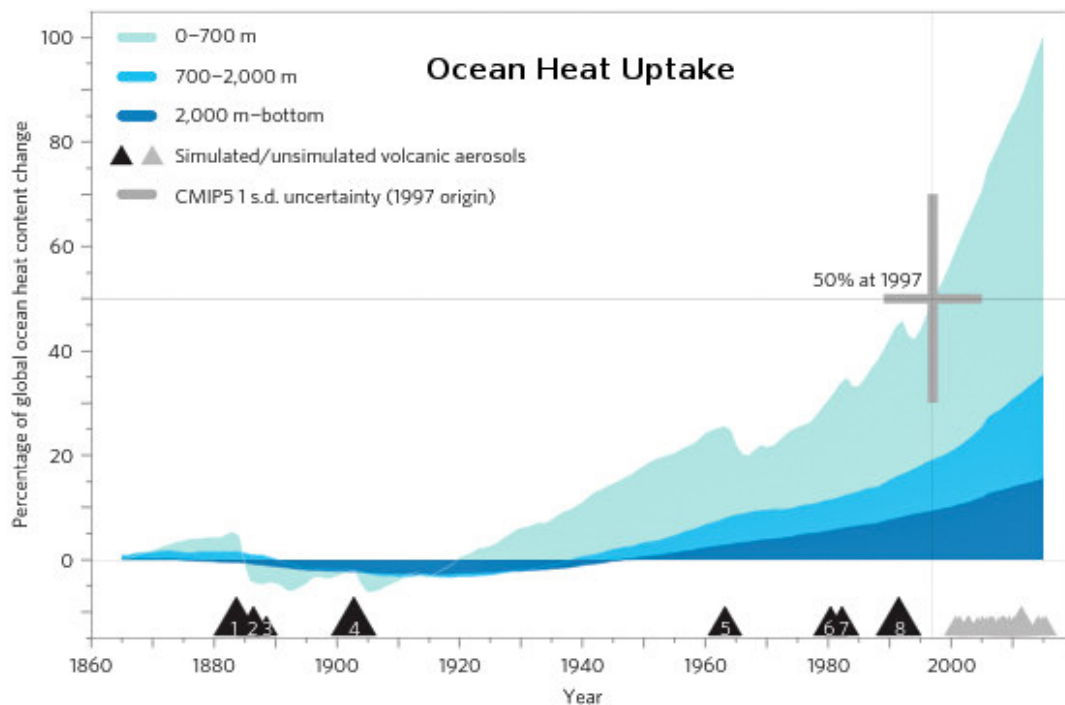


Figure 5.1.1 Ocean Heat Uptake, 2016

Based on the above analysis, this modern art museum is defined as a mix-used public building. Nonetheless, the building can serve more than an art container for amusement, but a piece of art itself with more profound social significance.

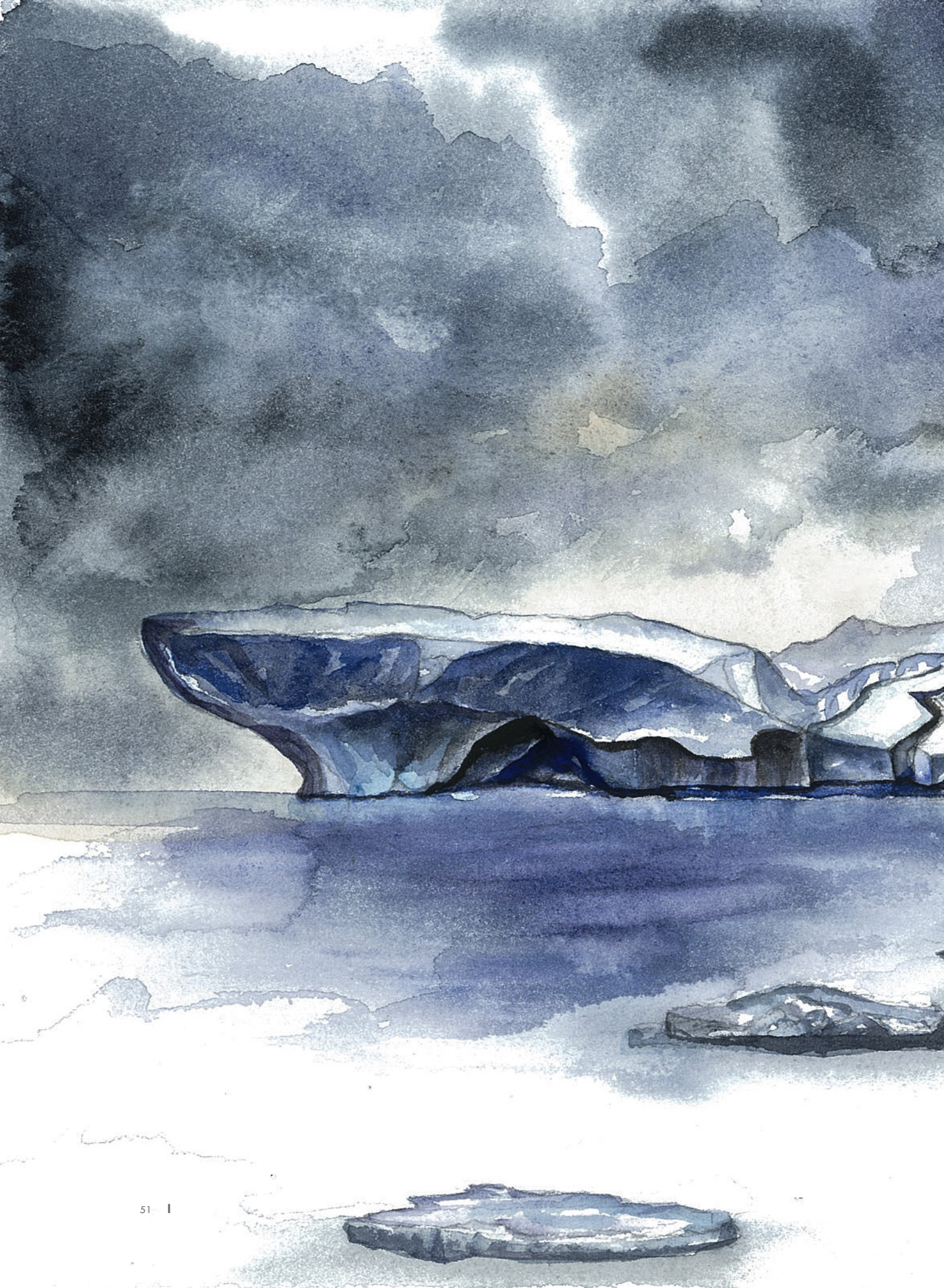
Like other coastal cities, Helsinki is also influenced by the effect of global warming and the rise of sea level. Indicated by scientific research, sea level worldwide is rising at a rate of 3.5 millimeters per year since the early 1990s. Even a small increase can have devastating effects on coastal habitats: cause destructive erosion, flooding of wetlands, contamination of aquifers and agricultural soils, and lost habitat for fish, birds, and plants (Sea Level Rise 2016). The direct reason for this phenomenon is the over-melting of large ice formations caused by global warming. This trend drives thousands of coastal city and islands in danger from ocean. Inspired by this urgent environmental issue, a melting iceberg-like mass is proposed, which stands at the Helsinki South Harbor, to remind people the urgent environmental issues we are facing and to raise the public awareness of environment protection.



Figure 5.1.2 A polar bear stands on an ice floe near Manitoba, Canada

From the appearance, the whole iceberg is melting into pieces and floating away. And different proportions show different melting conditions of the disintegrated parts. The sharp edges form a strong visual contrast against the curved caves.

The exterior is glassy and opalescent, reflecting the water and sky, and also gives the building a crystal look. But the inner cave-like tunnels are made from wood, creating a dramatic contrast with the cold 'ice' parts in material and color. As stated that museum-visiting is an amusing journey, the caves, openings, arch-entrance, bridges and corridors together inspire the visitors to discover and experience.



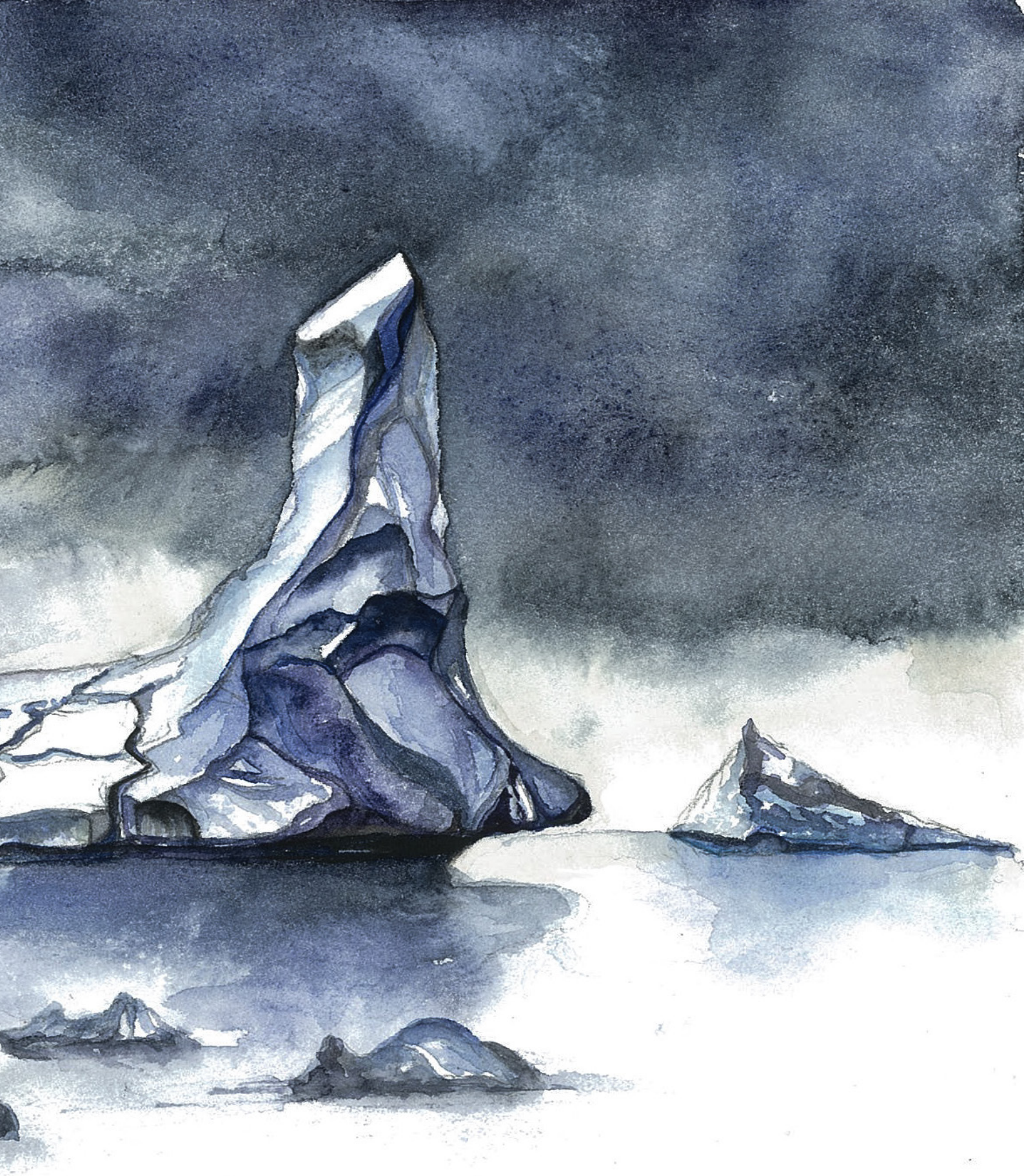


Figure 5.1.3 Melting Iceberg Watercolor Sketch

52
Fauler
T. Fälsch



Figure 5.1.4 Building Concept Abstracted from Melting Iceberg

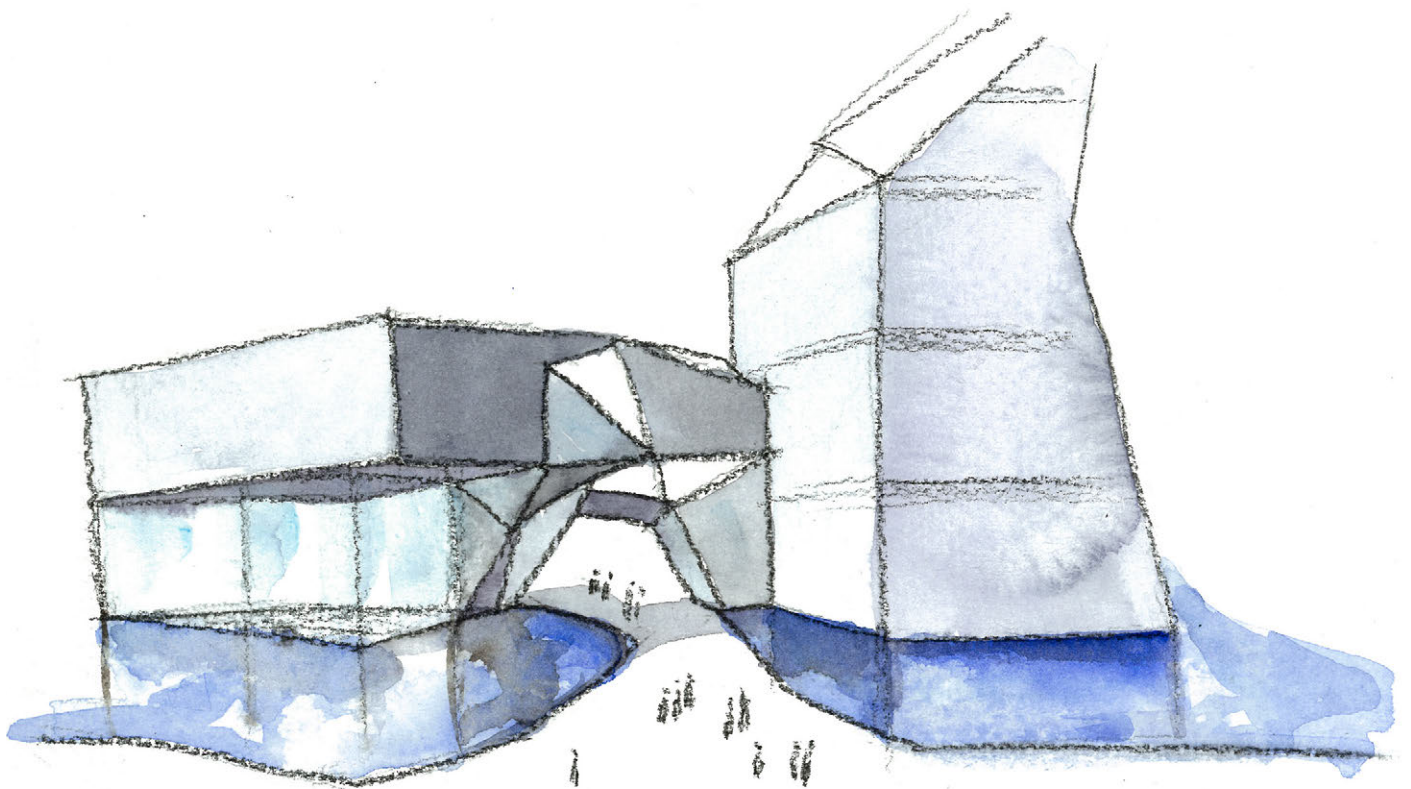


Figure 5.1.5 Ice Arch as the Entrance

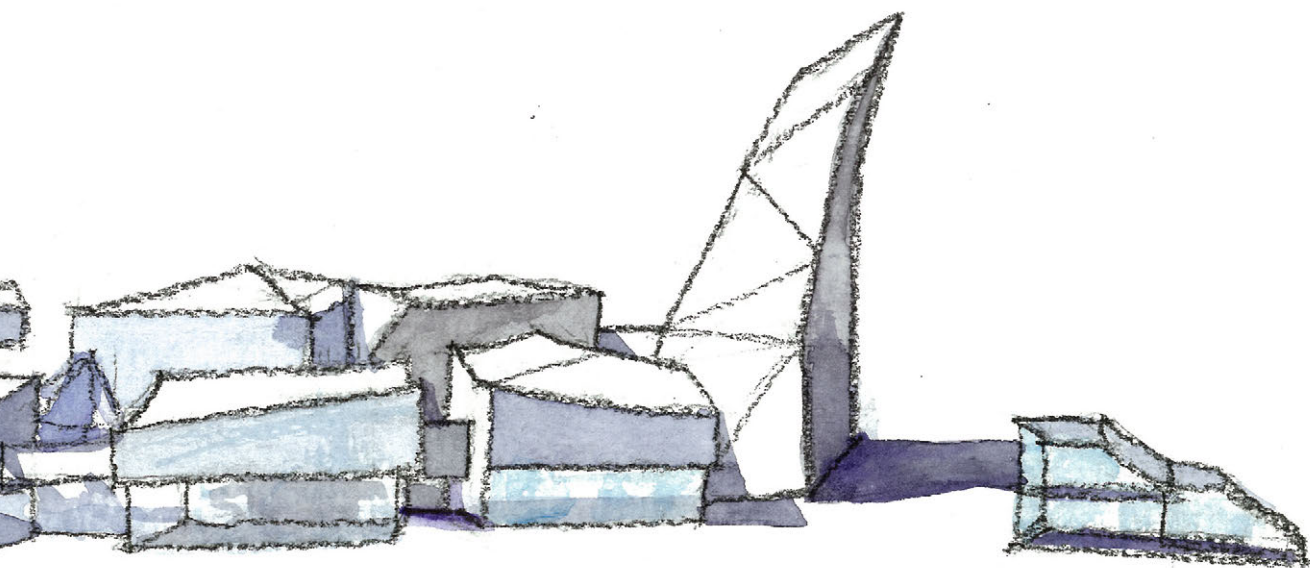


Figure 5.1.6 Tunnel Space inside the Building

5.2 Shape Formation

As located in the intersection of the block grids and the harbor edge, the initial plan comprises three parts: a composition of smaller buildings in the direction of urban blocks, large mass in parallel with waterfront edge and the joint in the middle.

By the natural curve outlined by Laivasillankatu, the entire layout is slightly bended along the back side. The parts in small scale are rearranged with atrium and outdoor garden, forming similar urban fabric to the four existing buildings in the back. While the larger mass is an echo to the adjacent harbor warehouse in size.

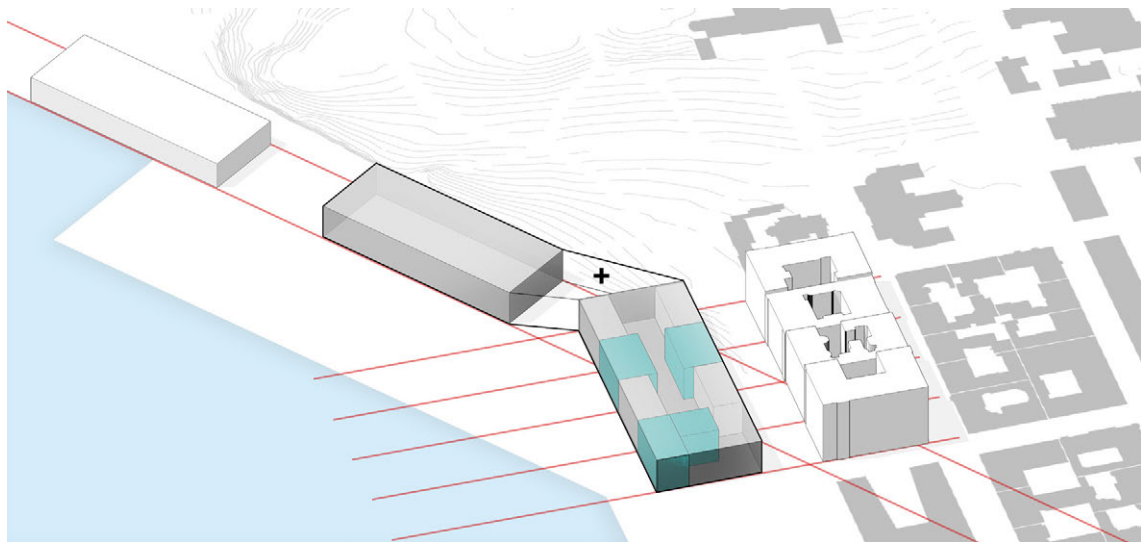


Figure 5.2.1 Abstract the Mass from Existing Urban Context

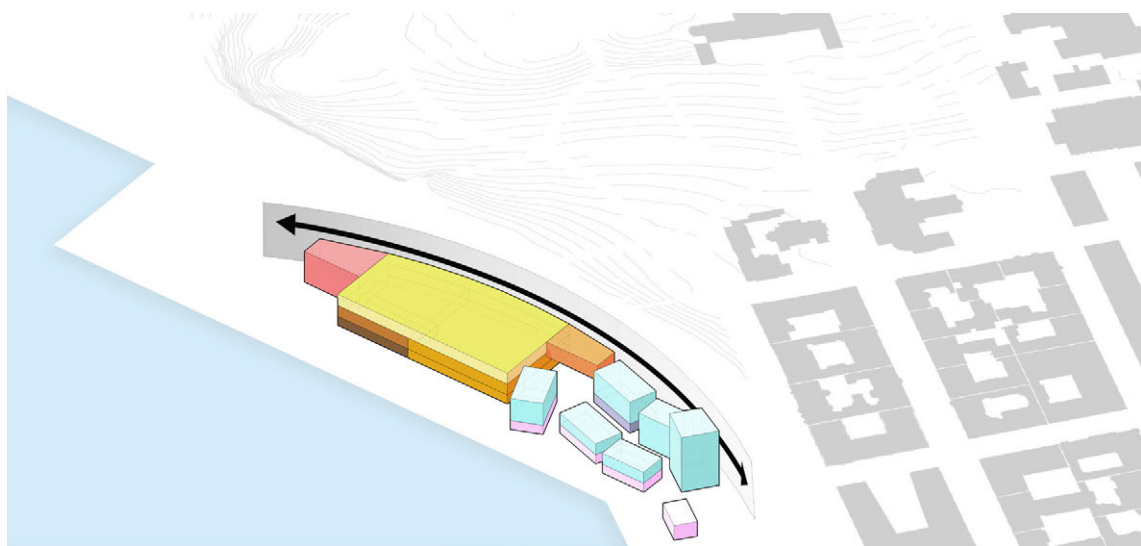


Figure 5.2.2 Bended Layout

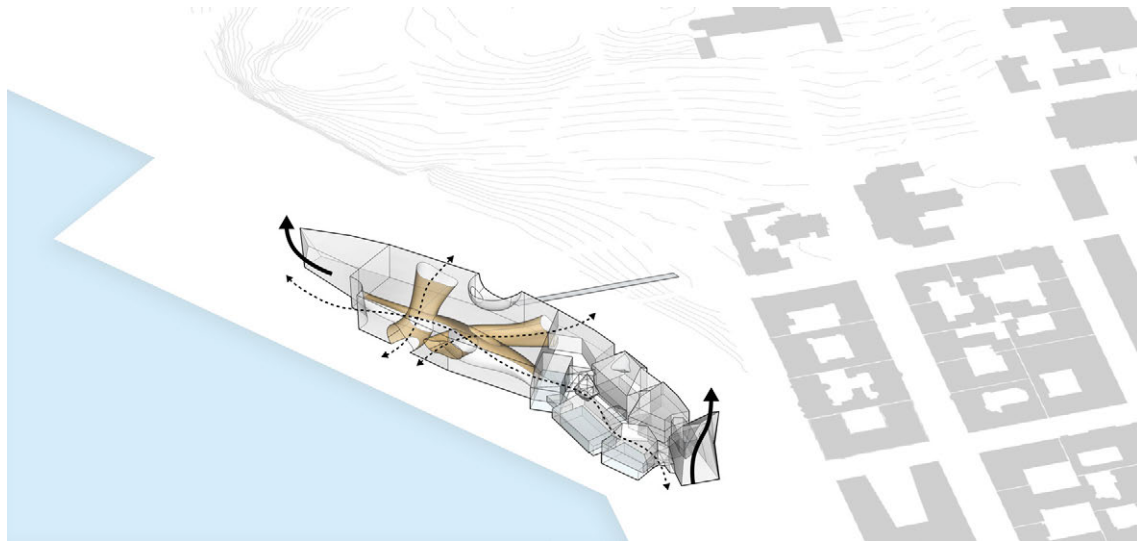


Figure 5.2.3 Extruding and Digging

The whole building is horizontally extruded from the site. Yet, the entrance tower is carved into an angular polyhedron, to be a landmark visible from afar and also to lend an entirely new vertical accent to the horizontal layout that characterizes the city of Helsinki. Conversely, the performance box is bottom-lifted but grows horizontally. The main passage starts from the northern entrance to the very end in the southeast. The rest two tunnels point to the city center and Museum of Finnish Architecture and Design Museum separately. Variation in shape and proportion, the tunnels work as arteries to vitalize the entire building.

There is no designated visiting route, so visitors could enjoy the freedom to discover the path individually. Yet, it doesn't mean to wander in a maze and get lost. The general sequence is guided by the exhibition in the display part, and then leads by the three main functions (design market, experience space and artists' atelier) in the latter part. Besides the main entrance near the Palace Hotel, more accesses are designed to the waterfront, greenway along Laivasillankatu and a bridge linking Bernhardinkatu.

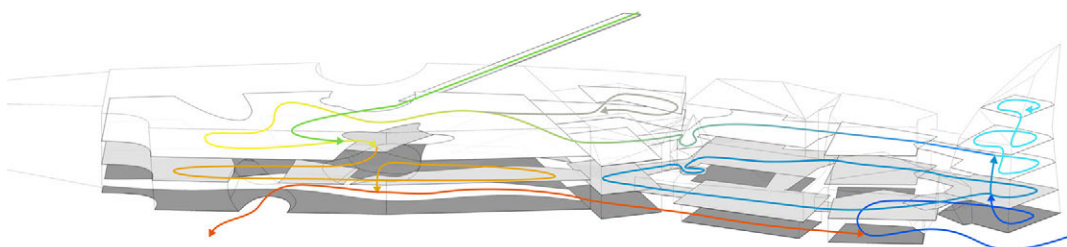


Figure 5.2.4 Possible Visiting Route

5.3 Site Plan

The overall site is 33,899 square meters and museum building is approximately 16,593 square meters gross area. An additional 293 square meters is functioned as the new port terminal. The museum building is also aligning with the existing buildings, starting from Eteläinen Makasiinikatu, ending in Kaartinkuja.

Currently, the site is underused and occupied by massive surface parking. Therefore, a boardwalk along the waterfront and sculpture venue in the south is planned as the extension of the art form inside to outside. And squares near Vanha Kauppahalli and Silja Line-terminaali, as a continuation of the Market Square which is prosperous for its open-air market, are effective ways to activate the vitality of this area. Large stairs is designed to open a shortcut from the elevated pedestrian route in the far south to the sculpture square. And a bridge connecting the museum with Bernhardinkatu in the proximity of Tähtitornin vuori park is another key approach to enhance the public outreach.

By adding greenery along the back road and space in and around the museum, a pedestrian friendly, boulevard ring is formed all the way along the quay. In larger scale, by filling this green gap, the green network of this region is perfected.

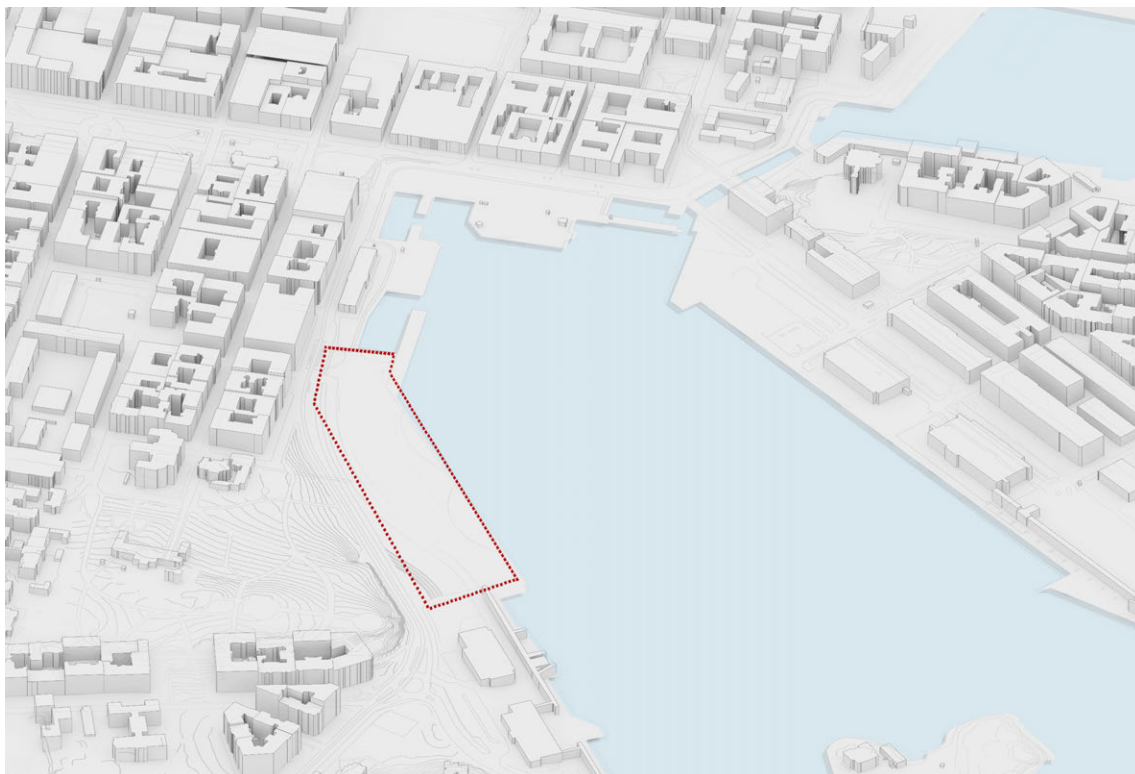


Figure 5.3.1 Design Site

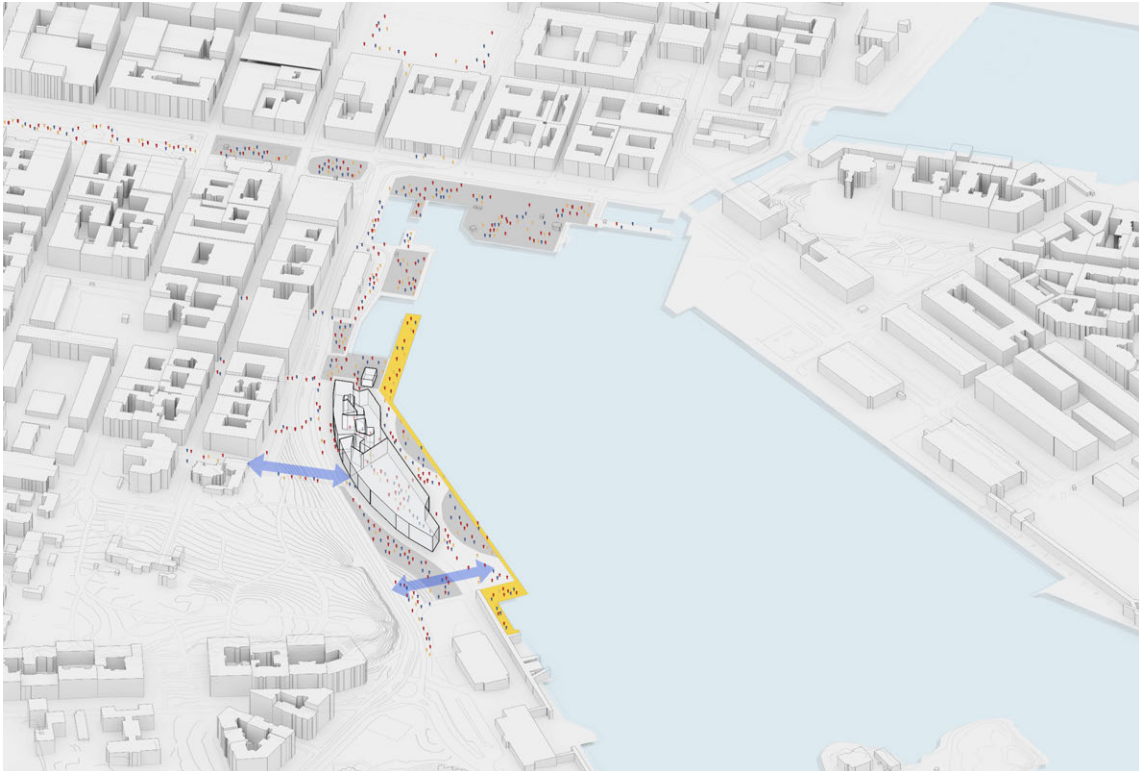


Figure 5.3.2 Enhancing Public Space

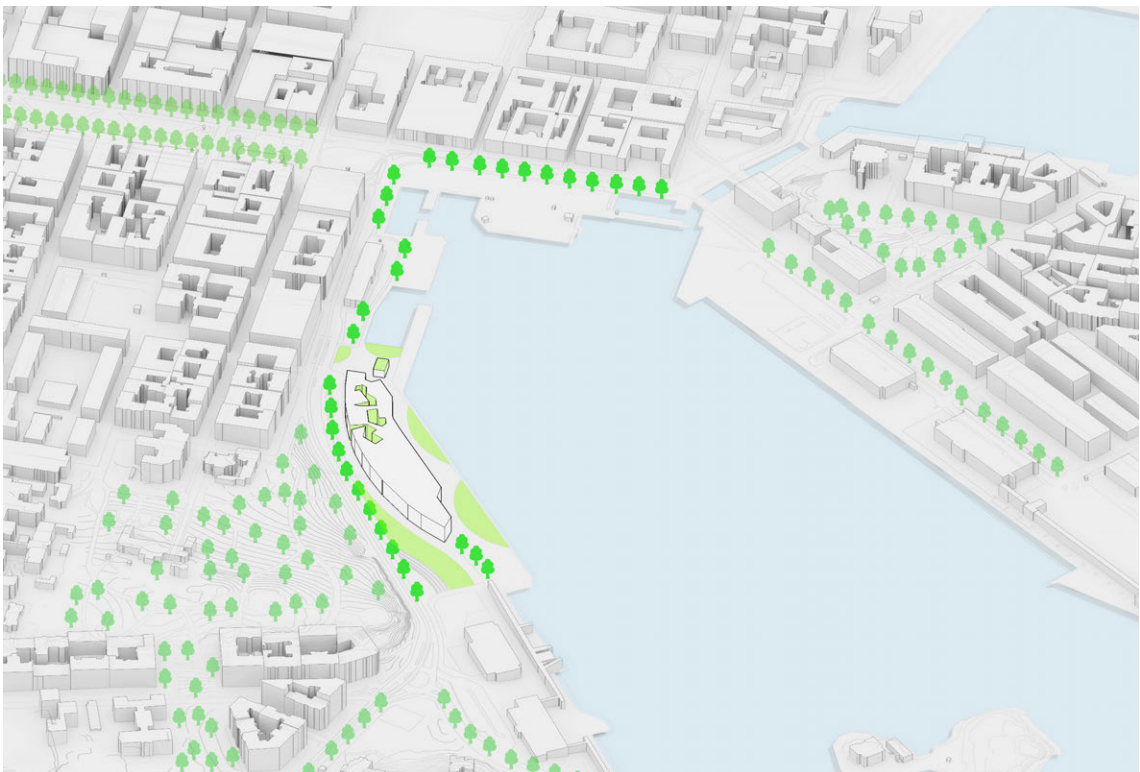


Figure 5.3.3 Adding Greenery

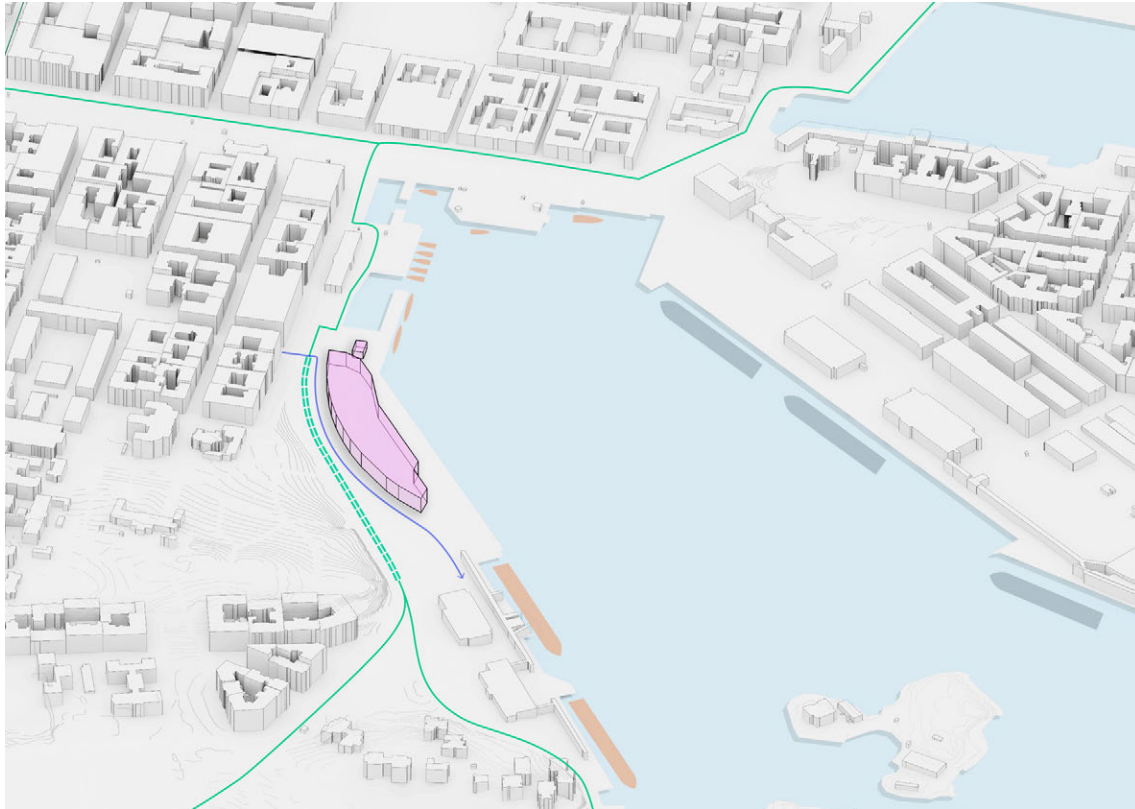
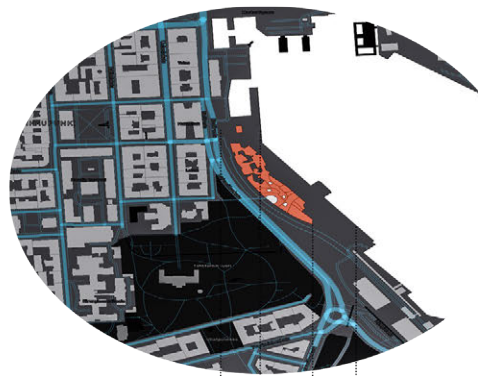


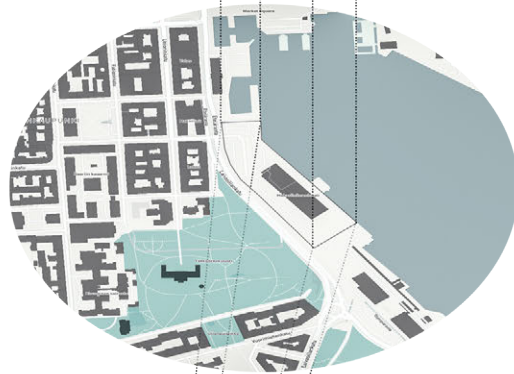
Figure 5.3.4 Reorganizing Traffic

In terms of traffic, the site is well-served by Helsinki's public transport network, including a tram stop Eteläranta. Cycle and pedestrian accessibility to the site are equally good. Yet, the greenway along Laivasillankatu is extended to 5.0 meters, to enhance the existing pedestrian traffic. Another good option is arrival by water traffic, as the Suomenlinna ferry dock in Market Square for domestic visitors as well as the Olympia passenger terminal for visitors from abroad. According to the new function layout, vehicular access to the port is only available from the west (along Eteläinen Makasiinikatu). Hence, a new two-way route with the width of 10 meters and 5.5-meter clear height is planned to both serve the museum and heavy goods vehicle access to the port. Drop-off area for taxis, VIP guests and emergency parking is provided near the main entrance. There is no on-site ground parking area, only controlled parking spaces reserved for disabled visitors and staff. However, there is planned underground parking lot nearby, which is invested by the City of Helsinki and predicted to accommodate 500 vehicles and can be shared by the museum. While several bicycle parking points are proposed for visitors and staff within the site (Malcolm Reading Consultants 2014).

A new distribution of ships is proposed to reduce the interference heavy water traffic. Cargo vessel is shifted to the east side of the quay, which also eliminate the large truck moving through city center at the same time. Large passenger ship is controlled in the southwest, while other small-scale passenger boat can be parked along the western port.



New Museum



Urban Fabric



Traffic Network



City

Figure 5.3.5 Relationship of Building and Surroundings

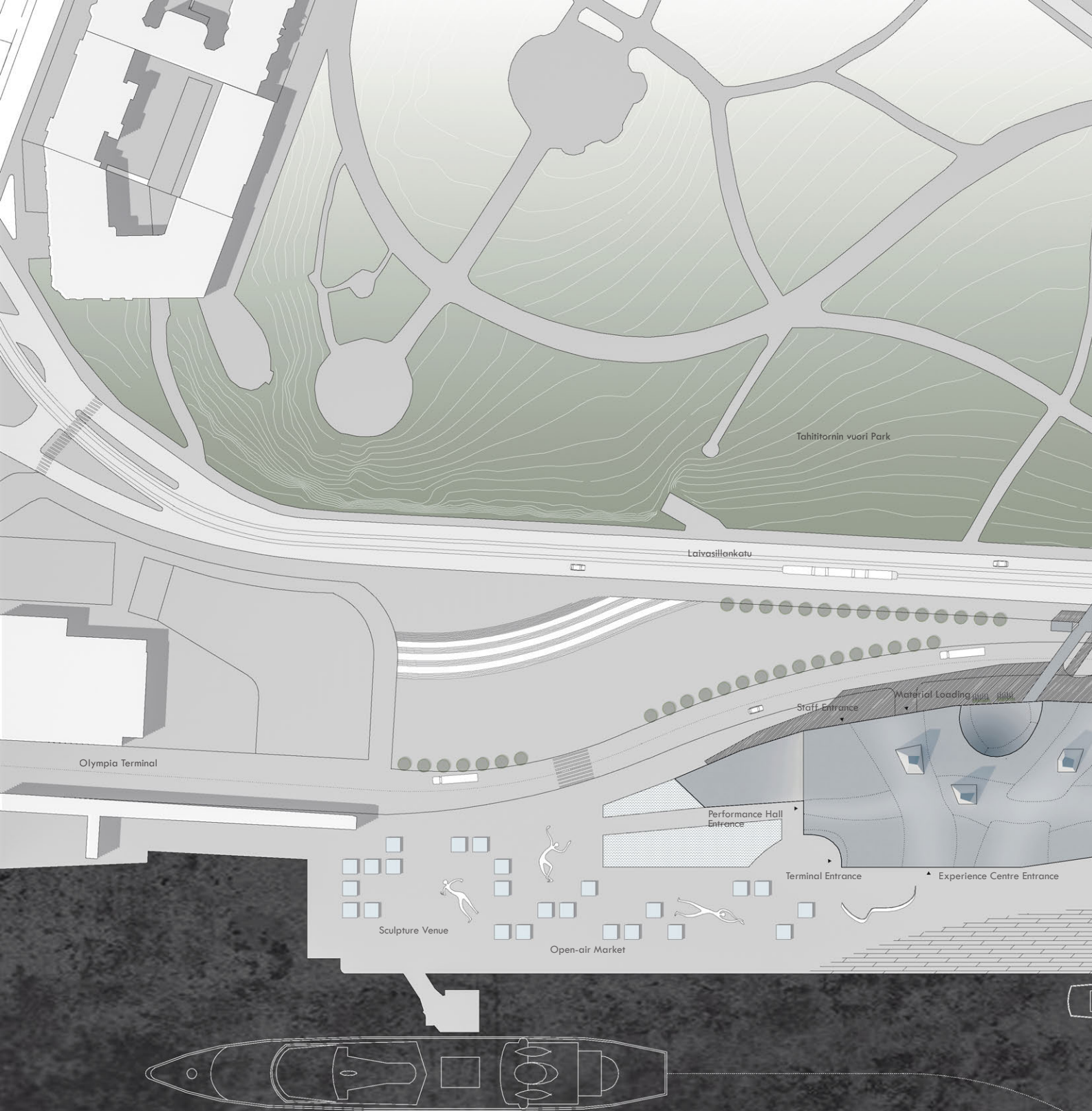


Figure 5.3.6 Site Plan



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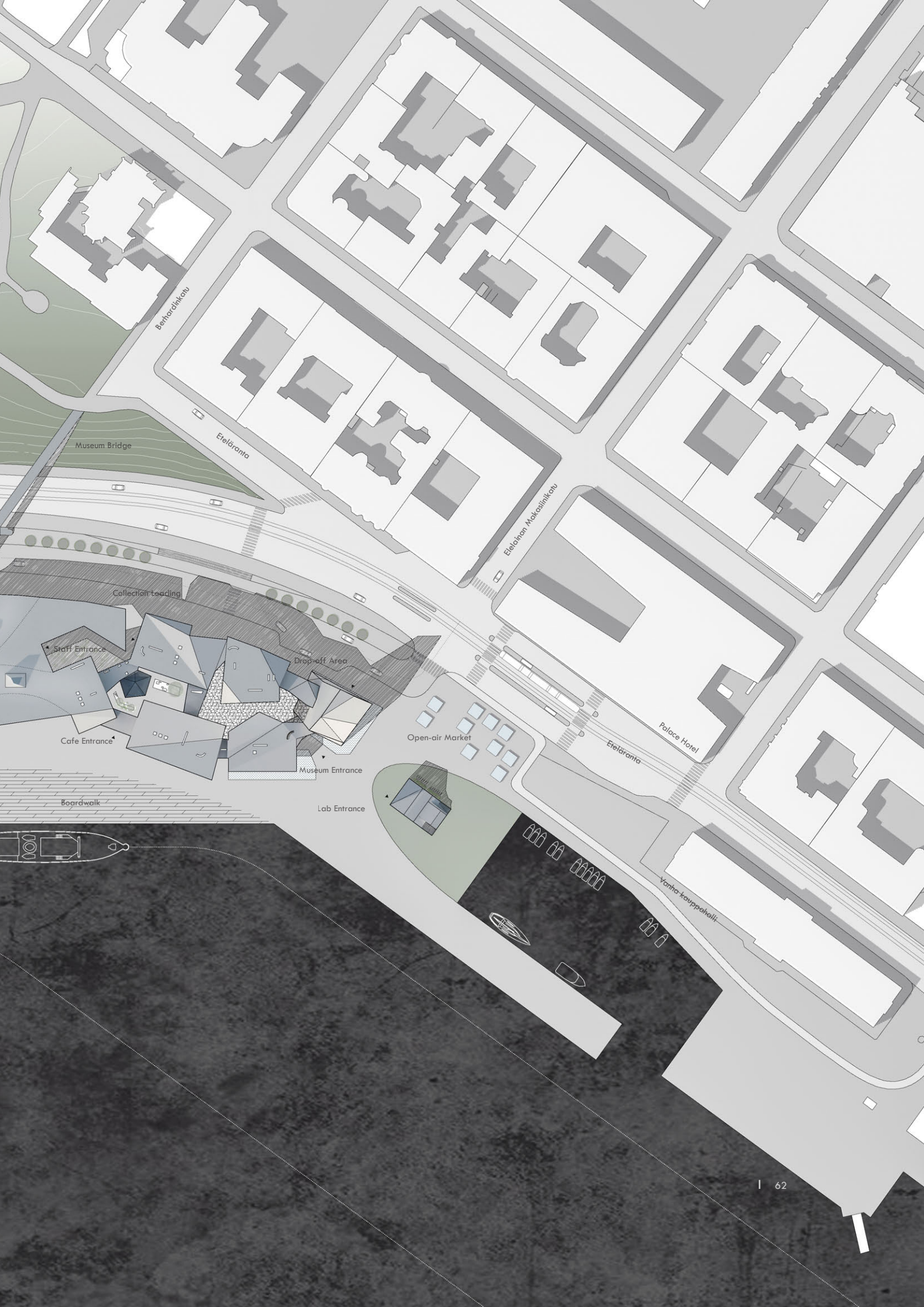


Figure 5.3.7 Aerial Perspective from Market Square

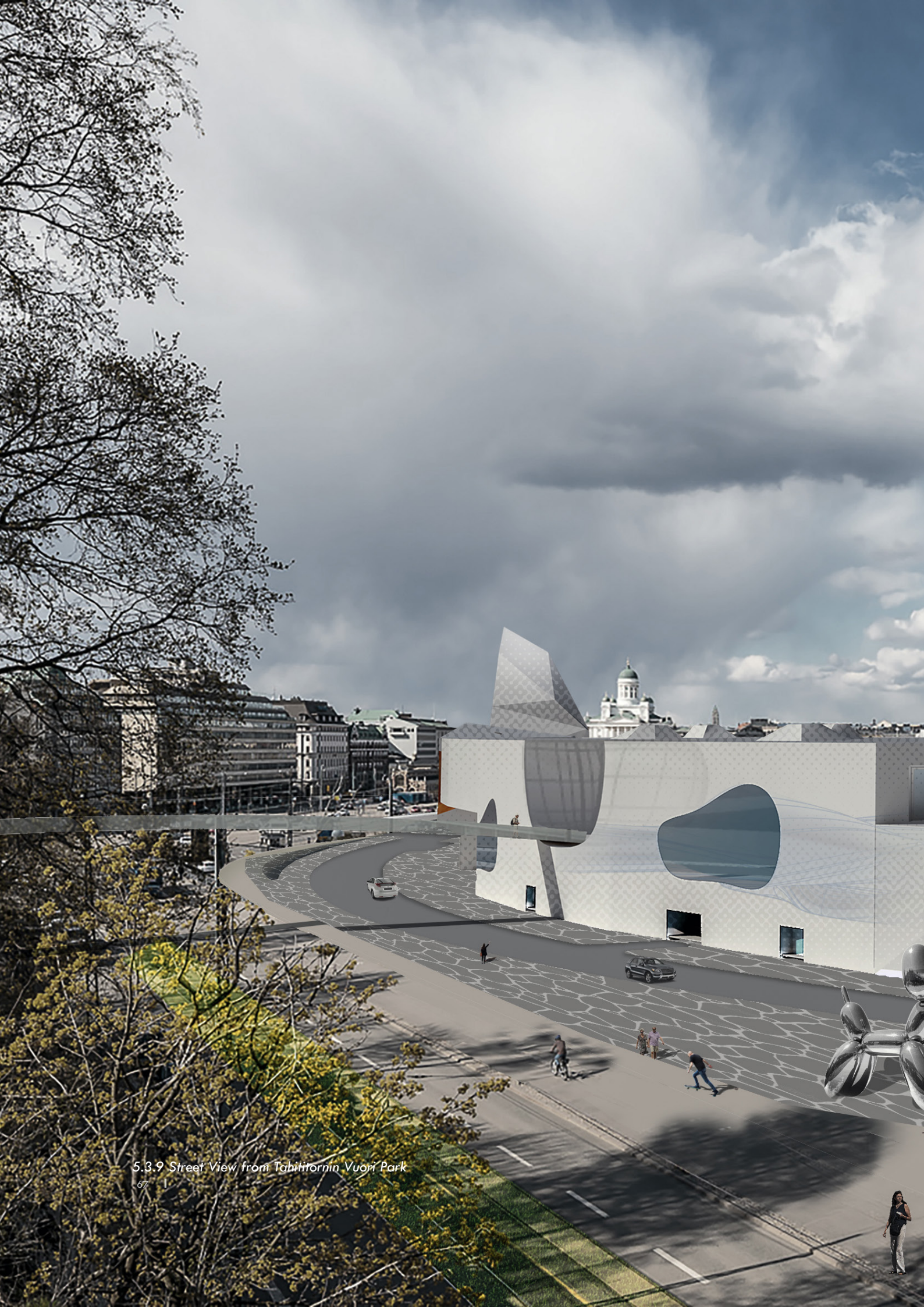






Figure 5.3.8 Night View from Water





5.3.9 Street View from Tahitihornin Vuori Park





Figure 5.3.10 Winter View from Icy Sea



5.4 Floor Plan

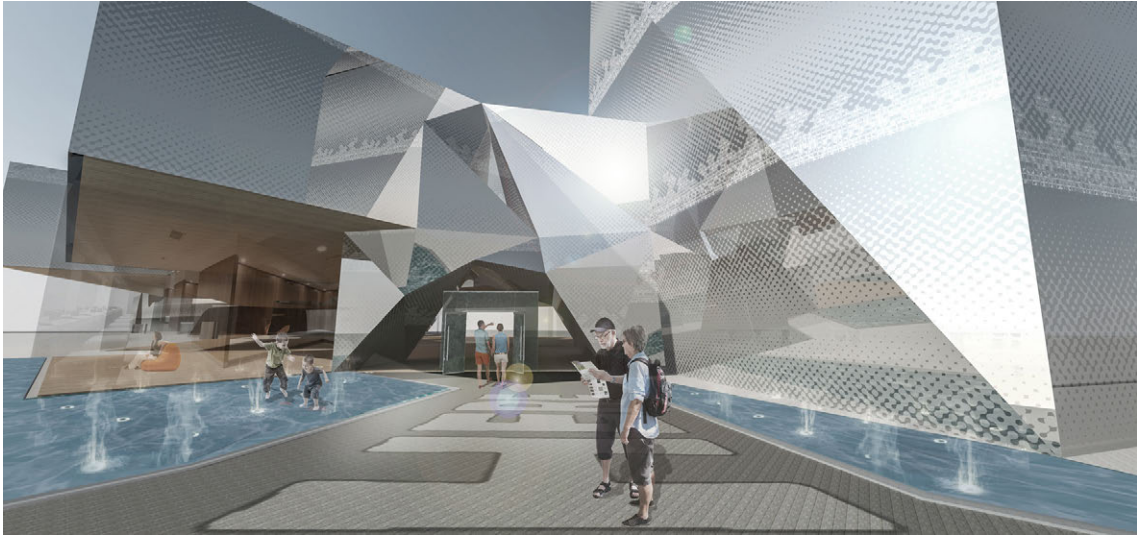


Figure 5.4.1 Museum Entrance Perspective

In order to make the new museum a genuinely public attraction, it is imperative to create not only attractive architecture but also an attractive mix of urban uses. The area between Eteläranta and the waterfront is a new public square guiding people to the entrance of the museum and the lab.

From north to east, the museum lab is a specially designed mobile laboratory, which extends the exploratory missions beyond the museum walls through groundbreaking initiatives. Covered by an accessible roof, all the other elevations are totally transparent, which celebrates openness and encourages public engagement. All the building parts are movable, thus, moving to other cities to spread new and stimulating ideas. All kinds of activities about urban life, such as lectures, workshops, exhibitions, performances, screenings and debates, can be developed as regular programs.

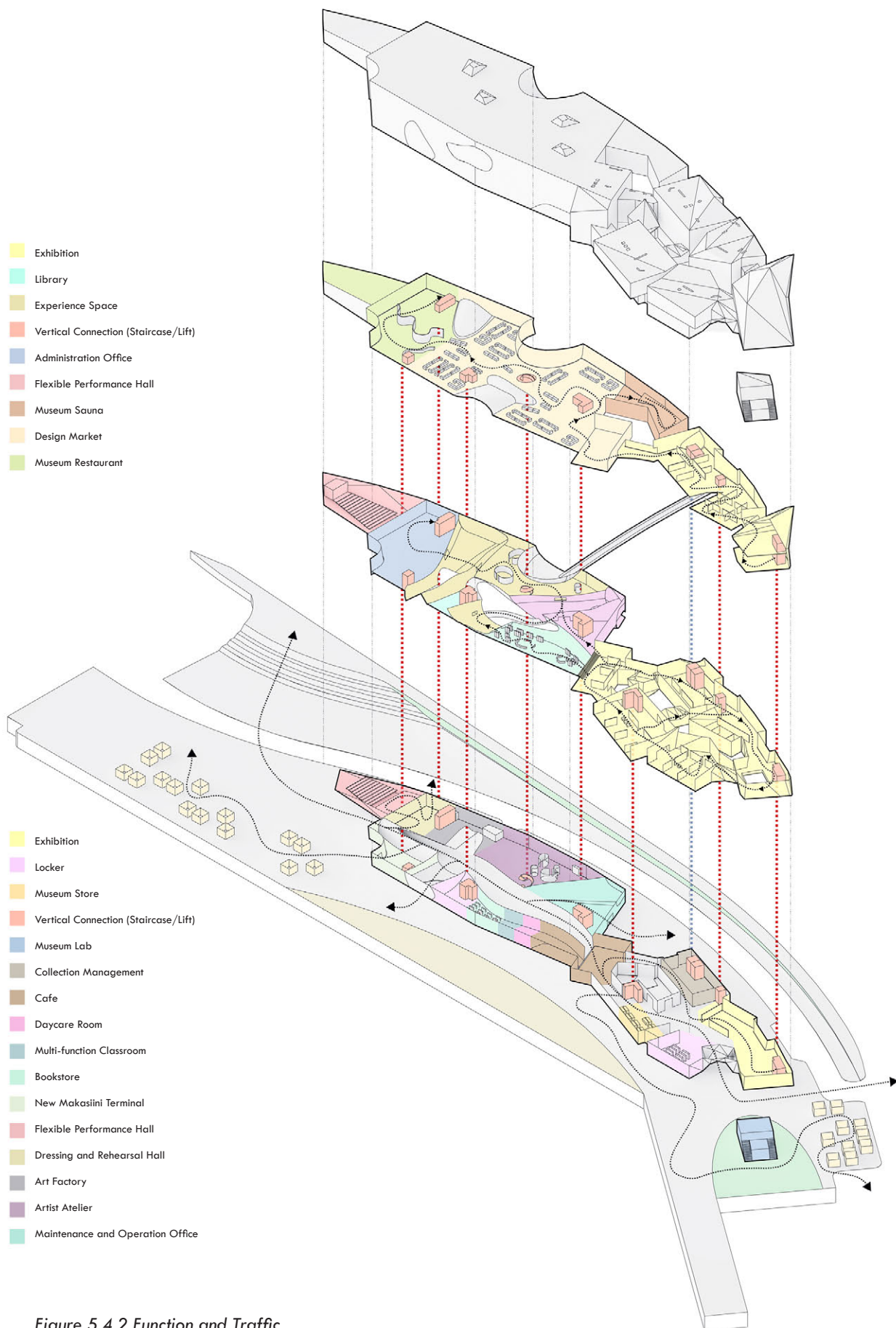
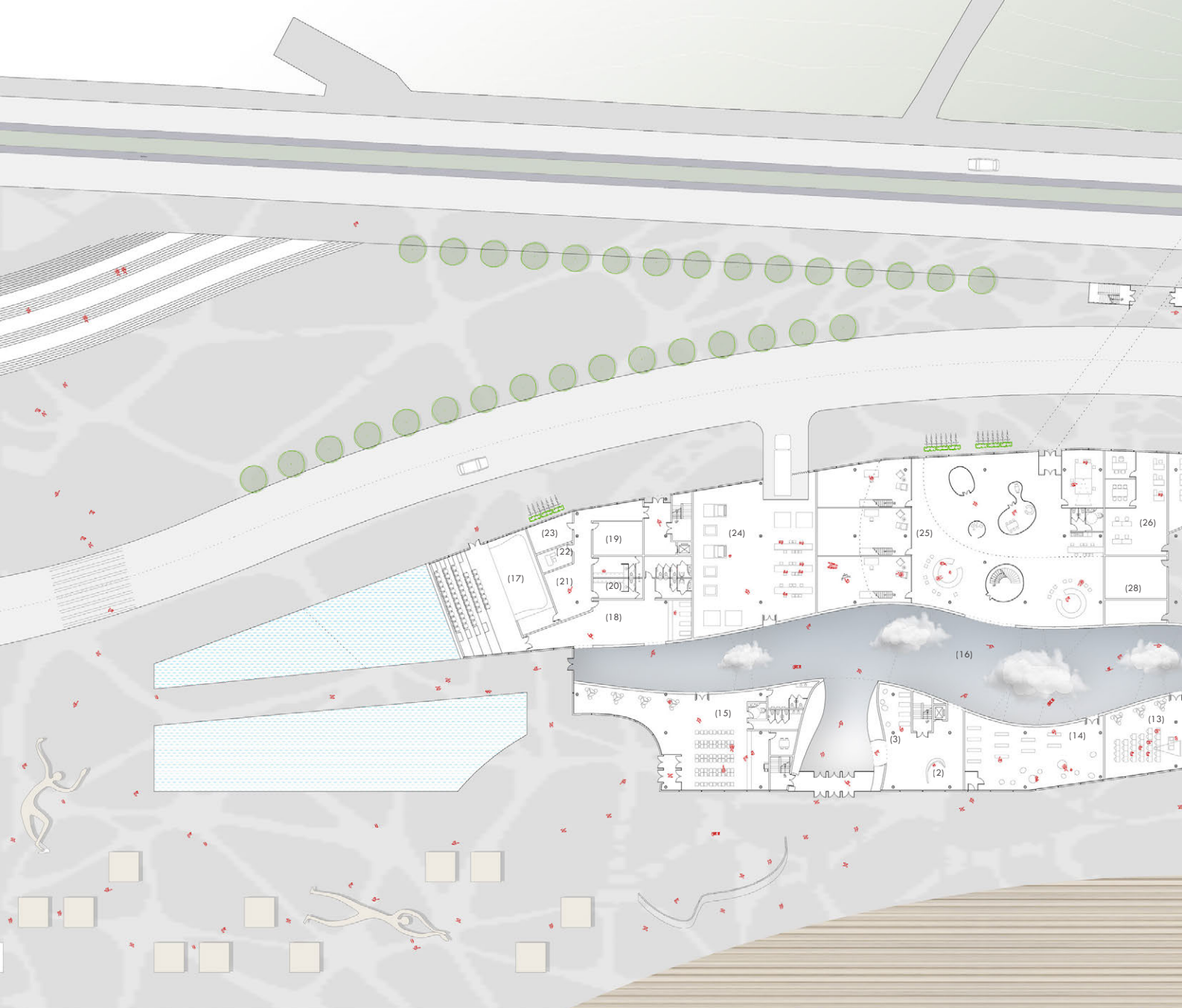


Figure 5.4.2 Function and Traffic



- 1 Visitor Screening
- 2 Ticketing and Information Desk
- 3 Coat Check
- 4 Temporary Exhibition
- 5 Museum Store
- 6 Shipping/Receiving
- 7 Uncrating/Staging
- 8 Shared Art Prep and Conservation Studio
- 9 Registrar & Tech Offices
- 10 Garden
- 11 Cafe
- 12 Daycare Room
- 13 Multifunction Classroom
- 14 Bookstore
- 15 New Makasiini Terminal

- 16 Atrium
- 17 Flexible Performance Hall
- 18 Foyer
- 19 Rehearsal Hall
- 20 Dressing Rooms
- 21 Green Room
- 22 Simultaneous Translation Booth
- 23 Technican Office
- 24 Art Factory
- 25 Artist Atelier
- 26 Maintenance Office
- 27 IT Server
- 28 Equipment
- 29 Museum Lab





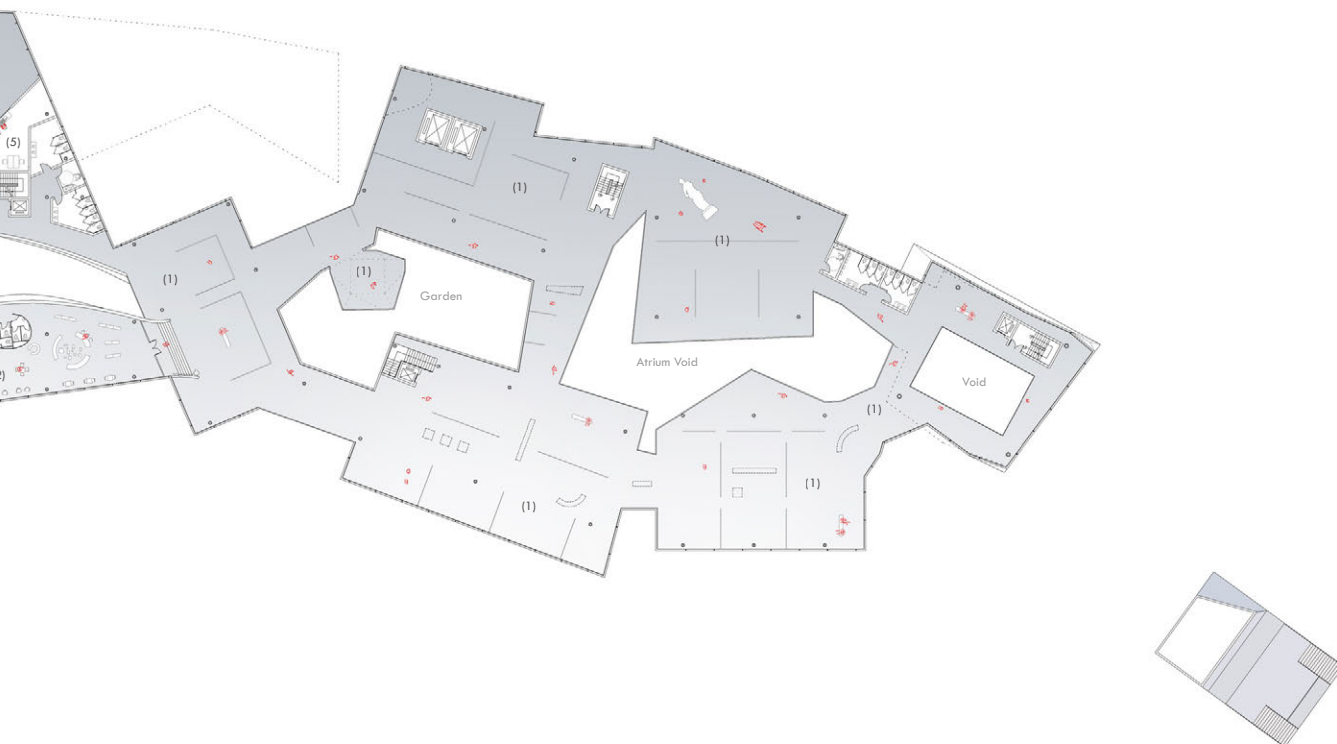
Figure 5.4.3 First Floor Plan

Figure 5.4.4 Second Floor Plan



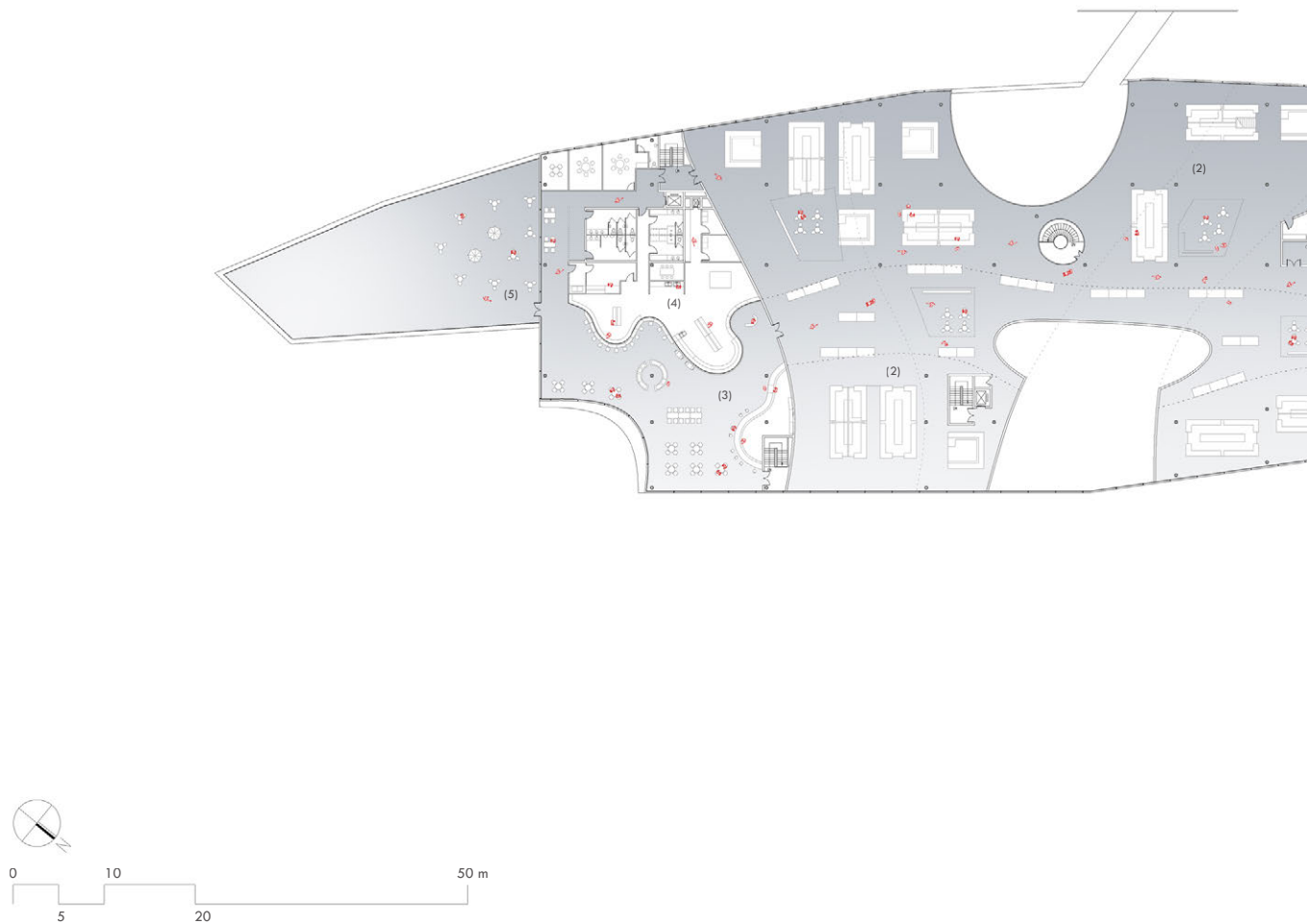
Facing the lab is a studiously low-key entrance of the museum. It is shaped as an icy archway to greet the visitors. Then the space is ascending to a two-storey high atrium. A pebble-shaped info and tickets center is within the nearest reach of the visitors. After leaving the coats in the self-service lockers, two temporary exhibitions serve as appetizers to tantalize the audiences. An eleven-meter high space is home to large-scale sculptures and installations.

Stepping up to the second floor by the lift or staircase, one can observe the huge art piece from higher 360 degree views. Guided clockwise, a series of contiguous gallery spaces is unrolled. There are six main exhibition rooms on the second floor, and each of them is connected by corridors that suitable for smaller and linear exhibition. Different in size and height, these spaces can be easily joined and divided as needed. A diamond-shape space is the venue for special new media display. It is the ice heart of the museum.



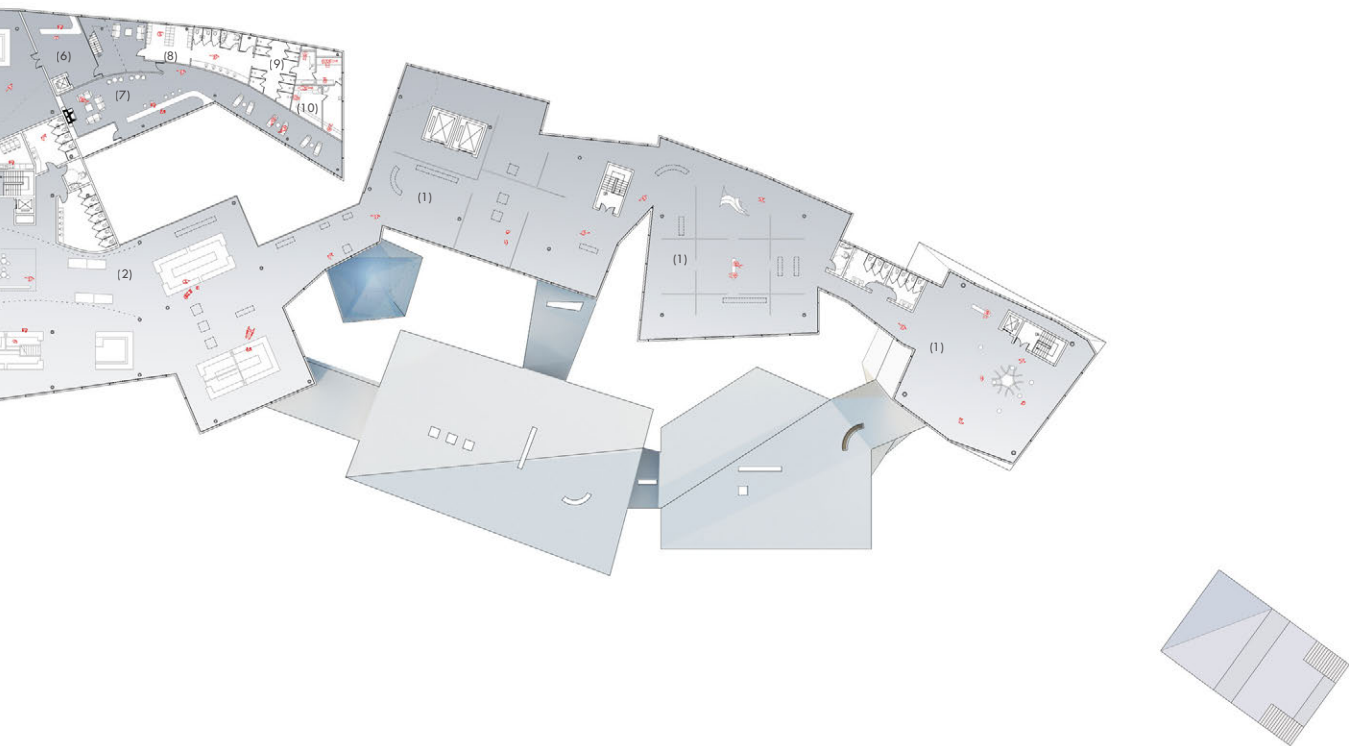
- | | |
|-------------------------|----------------------|
| 1 Exhibition Galleries | 10 Exhibition Design |
| 2 Museum Library | 11 Archivist Office |
| 3 Workshop Space | 12 Marketing Office |
| 4 Library Office | 13 Conference Room |
| 5 Music Studio | 14 Shared Work Room |
| 6 Improvisation Space | 15 Fitness Room |
| 7 Art Experience Space | 16 Staff Lunch Room |
| 8 Administrative Office | 17 Projection Booth |
| 9 Curatorial Office | |

Figure 5.4.5 Third Floor Plan



Another four linked galleries are located in the third floor. Following the linear route, the visitors reach the design market. Occupying around 2,700 square meters, it will be the holy venue for art trading, where a wide range of art selections are hosted: interior products, furniture, clothes and accessories. The individual artist or company can rent the wooden hut to show their products. And visitors have the opportunity to make great finds among the high quality design objects. The market will also be included in the Helsinki Design Week program.

To perfect an exciting but intensive cultural day, to sit down and enjoy an indulgent lunch is a must be. The formal restaurant close to the market is the place to go. To satisfy different dining preferences, buffet, table service, bar, private compartment and outdoor seating are planned. On the roof terrace, the guests could view the breathtaking panorama around the bay and feel the fresh breeze from the sea. The professional kitchen includes catering preparation and staging areas, food storage, refrigerated refuge store.

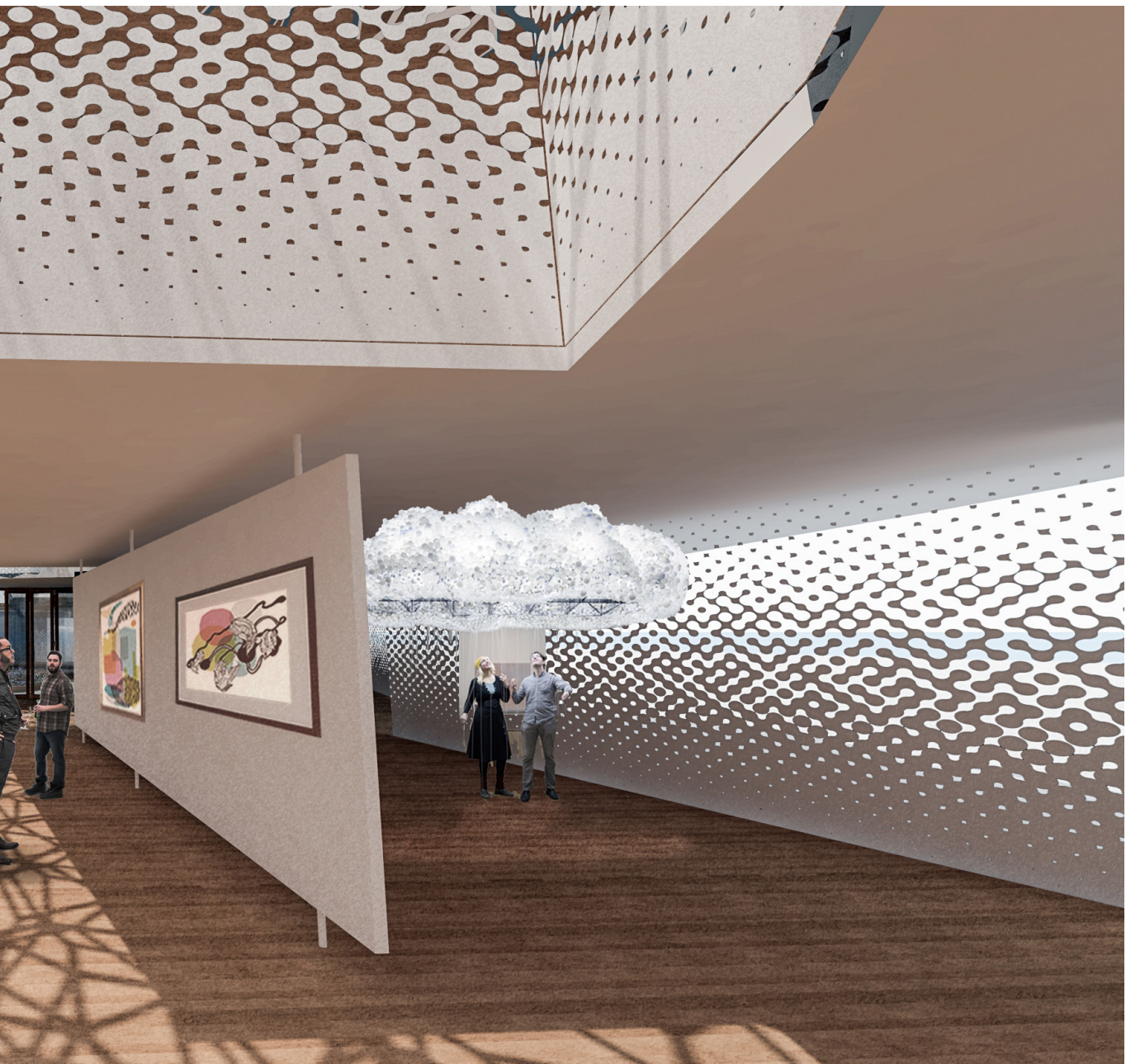


- 1 Exhibition Galleries
- 2 Design Market
- 3 Restaurant
- 4 Kitchen
- 5 Roof Terrace
- 6 Sauna Reception
- 7 Lounge
- 8 Dressing Room
- 9 Shower Room
- 10 Sauna



Figure 5.4.6 Atrium Perspective

Even fancier, a sky sauna is designed to relieve the fatigue. Overhung on the top floor, guests could capture theatrical views of both the quay and downtown Helsinki. Further inside, typical Finnish sauna heated in traditional way or modern way, definitely will give users a pleasant surprise.



Down to the second floor, a series of larger space function as art experience center, including a music studio, workshop saloon, and warp space. In the music studio, musicians could operate professional recording equipment for their composition. And next to it is a curly performance space for improvisation, which originates from the street art. The biggest hall is a relaxed and stimulating place, which focuses on the interplay of the public and art. Visitors are free to try various ways of art creation, like painting, clay sculpture, paper-cut etc. A hemispherical part is excavated from the mass to shape the outdoor square, which is directly connected by the arch bridge from the pedestrian of Bernhardinkatu. Another indoor bridge winds towards the museum library, where projection room and reading area are located.



Figure 5.4.7 Garden View

The whole southern end is used for museum administration. The directors would have private offices, while staff members are working in open offices with shared meeting room and common space. There is a staff lunch room which facelifted with kitchenette and dining tables. Meals are served by the kitchen up floor via a food conveying elevator.



On the first floor, the latter part of museum building is dominated by a wooden cave space reaching the maximum height to 15.7 meters. It is the continuation of the atrium from northern part in the order of museum store, café and this curved hall. The store and café are organized around a garden, where typical Finnish plants are selected and cultivated, and irrigated by the water collected from rain and snow. The exquisite scenery could be captured from higher floors as well. The café not only offers indoor seats, but seasonal outdoor seating either on the close front of the shore or in the garden.

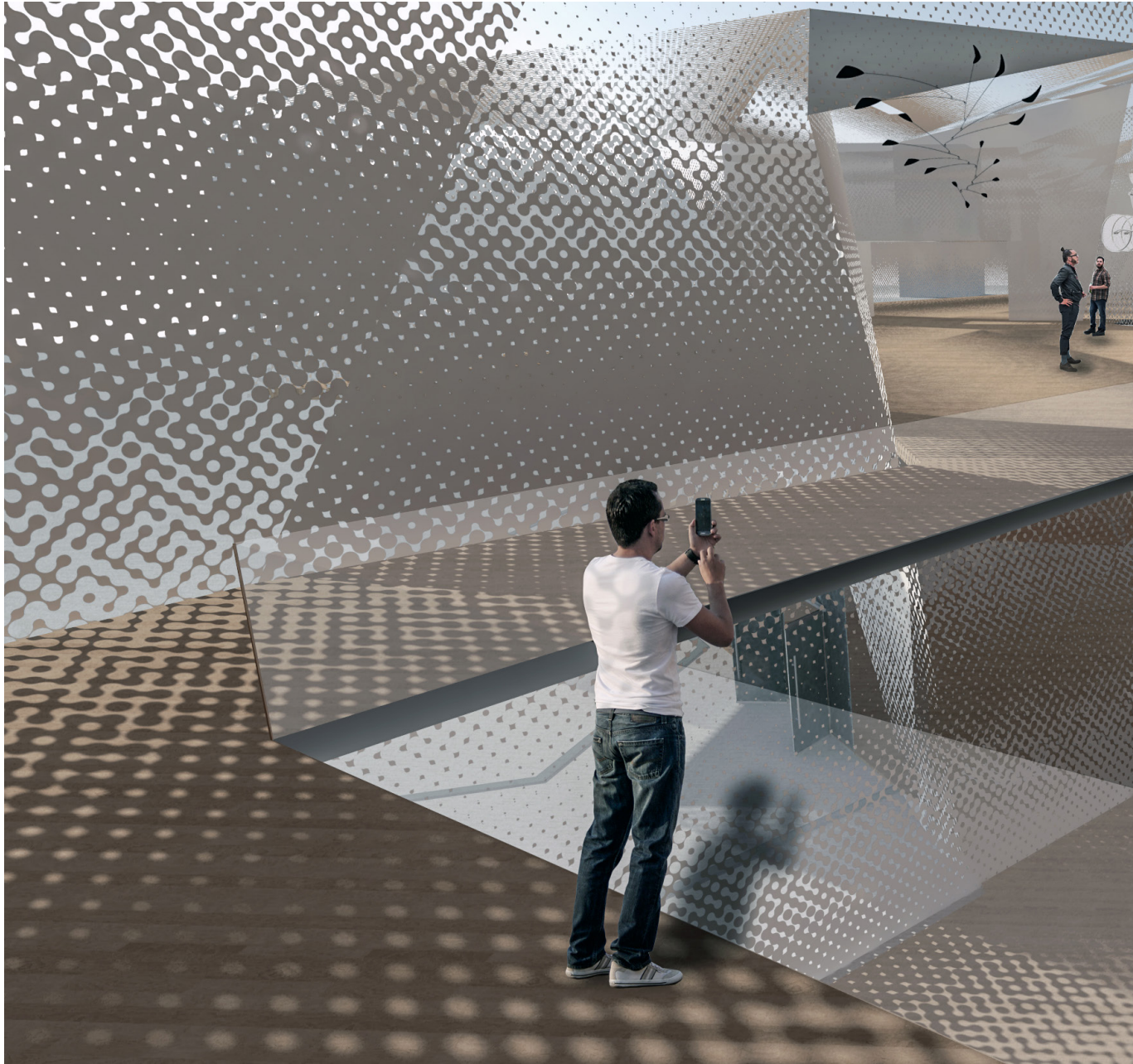
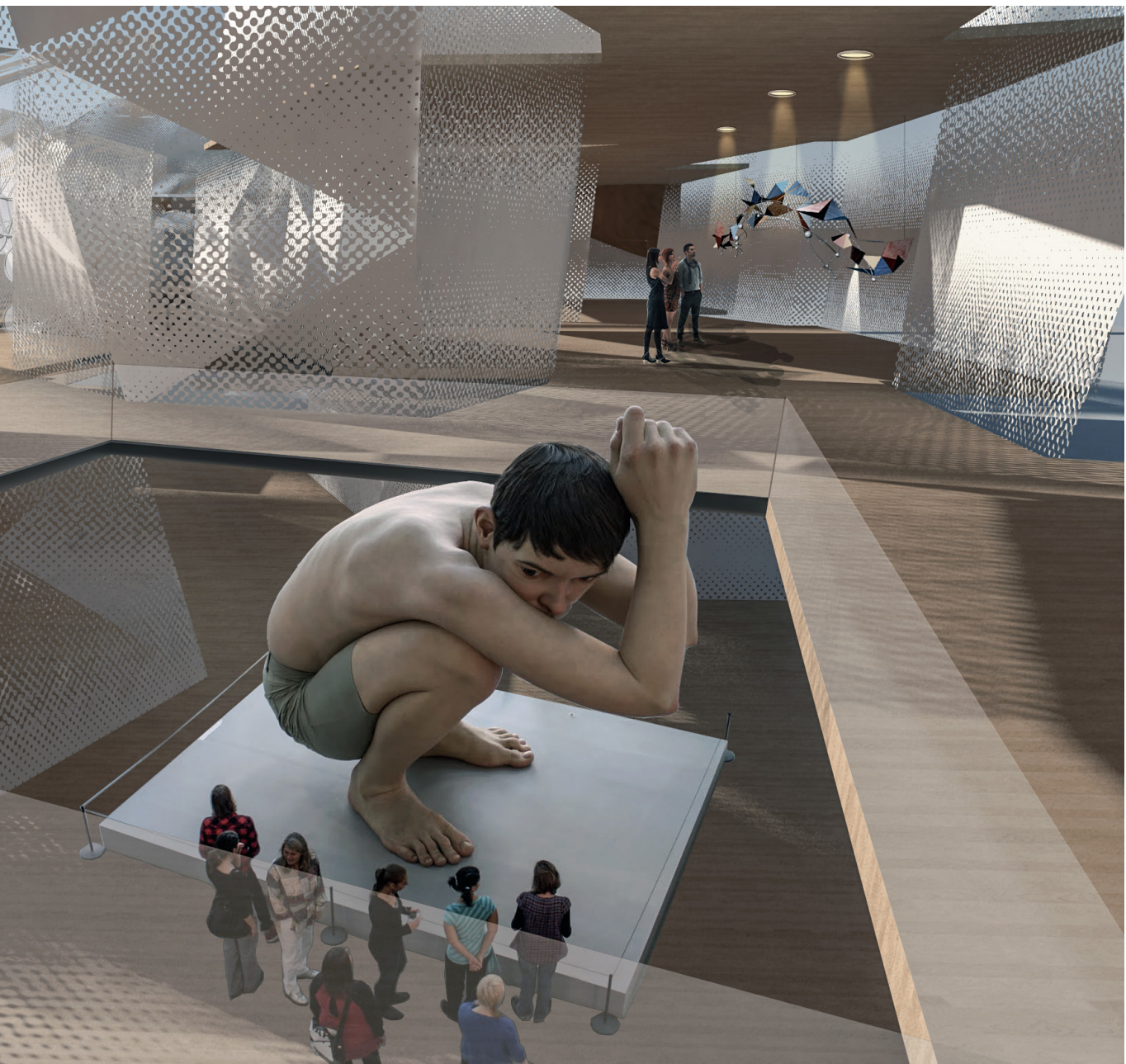


Figure 5.4.8 Gallery View

Compared to the concentrated atrium near the main entrance, the grand wooden hall is narrower and higher. But it is wide enough as a multipurpose zone capable of performances, special exhibition or other events. The floor plan is clear of columns that flexible to satisfy various programs. And it could catch adequate natural lights from the four big windows on both sides.

To offer meticulous public services, a daycare room is proposed for special care of small kids. Neighboring it is a multifunction classroom, flexible in layout for all kinds of user groups, both children and adults, and can support the use of all media.



The art incubator is on the other side of the 'street'. It consists of the artists' atelier and art factory. With the double-storey height, attic spaces are created as the artists' work room and bedroom. The place can be rented to selected individuals or groups. Outside the atelier compartments, there are shared conference room, kitchenette, and living room in the purpose of communication with visitors and peer artists. Worked together as the art incubator, the art factory is a heaven for wild ideas. It is featured with cutting-edge model making equipment, electronics desktops, working station and various hand tools. A material loading bay is open to the back street.



Figure 5.4.9 Tunnel Atrium

In the very end of the whole museum, sits the performance box. The base part is lifted, so inside the spectator seating takes advantage of the inclined slab. The hall could seat up to 160 with the flexibility to hold concerts, lectures, film, recitals, symposia and conferences. Support spaces includes foyers, coat check and restroom for audience, and dressing room, rehearsal hall, green room, projection booth, simultaneous translation booth and technician rooms for performers and staff.



There are two locations for the museum logistics. One is adjacent to the exhibition part. It is mainly for collection storage and management. The art collections are first received by the loading dock, and then either transported to the crate storage in the basement or staging areas on the first floor. Relevant departments like registrar, conservation and exhibition-design teams are working together in an open office.



Figure 5.4.10 Experience Space

Additionally, a new Makasiini Terminal with a passenger facility of 293 square meters replaces the existing one. It sits inside the main building but stand-alone in function to some extent. Waiting seats, tickets office and public toilets are provided as the core function.



Too often a new cultural center comes out to cater to the privileged few. But to be a genuinely public attraction, it is imperative to provide an attractive mix of urban uses not just attractive in appearance. As a result, the museum complex accommodates varied uses as in a city.

5.5 Section Plan

And like a city, the contradictory building parts of galleries and experience space ensure exciting, varied spatial sequences: on the one hand, the sharp and soaring feel of the ice tower marked by its relationship to the background building; on the other, the capricious, elegant world of the experience center. In between, there is an expansive topography of public spaces, all differing in character and scale: the large tree-shade covered atrium, accompanied by delicate Finnish garden, stretch out horizontally to the inwardly oriented wooden cave.

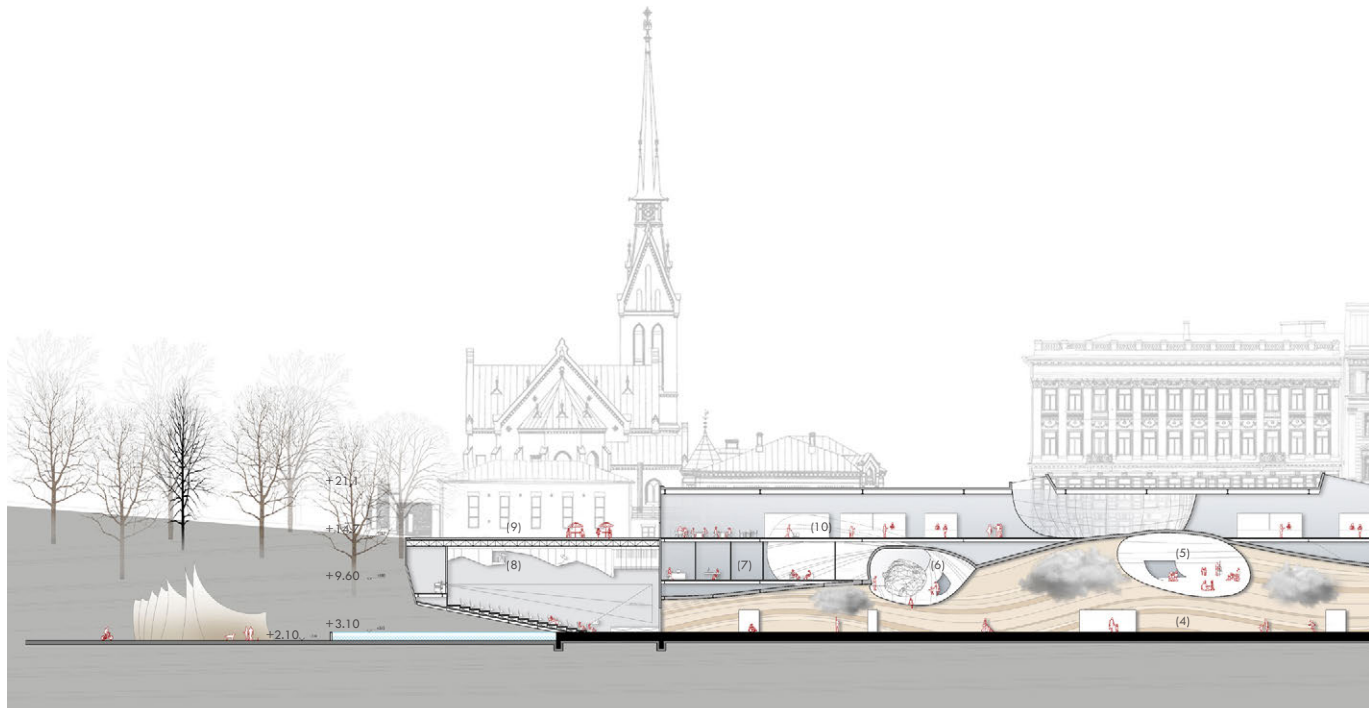
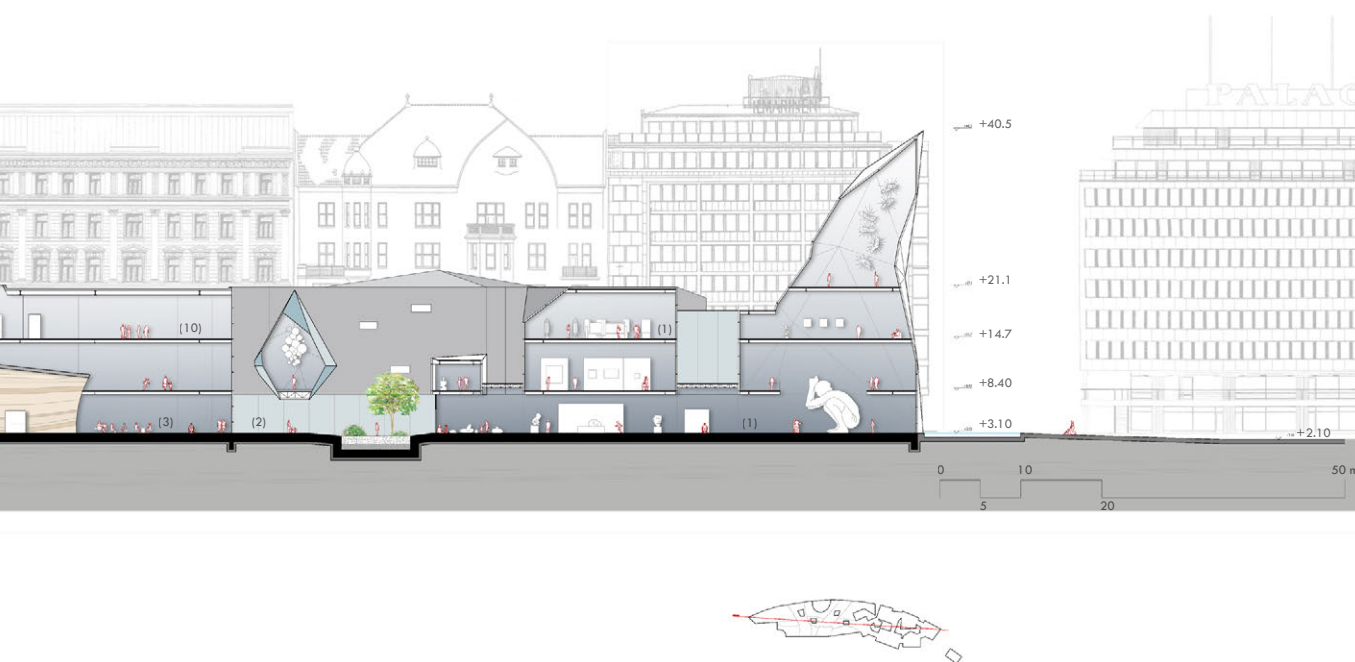


Figure 5.5.1 A-A Section Plan

- | | |
|------------------------|-------------------------|
| 1 Exhibition Galleries | 6 Art Experience Space |
| 2 Garden | 7 Administrative Office |
| 3 Cafe | 8 Performance Hall |
| 4 Tunnel Atrium | 9 Roof Terrace |
| 5 Improvisation Space | 10 Design Market |

The heart of the complex is the experience space. A destination emerged to foreground art viewers and art makers to such an extent that, together, they actually represent the architecture. Going through the architectural reformulation, the building typology lays unprecedented emphasis on the proximity between artist and audience—face to face.

The outdoor space of the museum also has an expressive dynamic. Along the pedestrian path of Laivasillankatu, large stairs are added to eliminate the obstacles made by height difference.



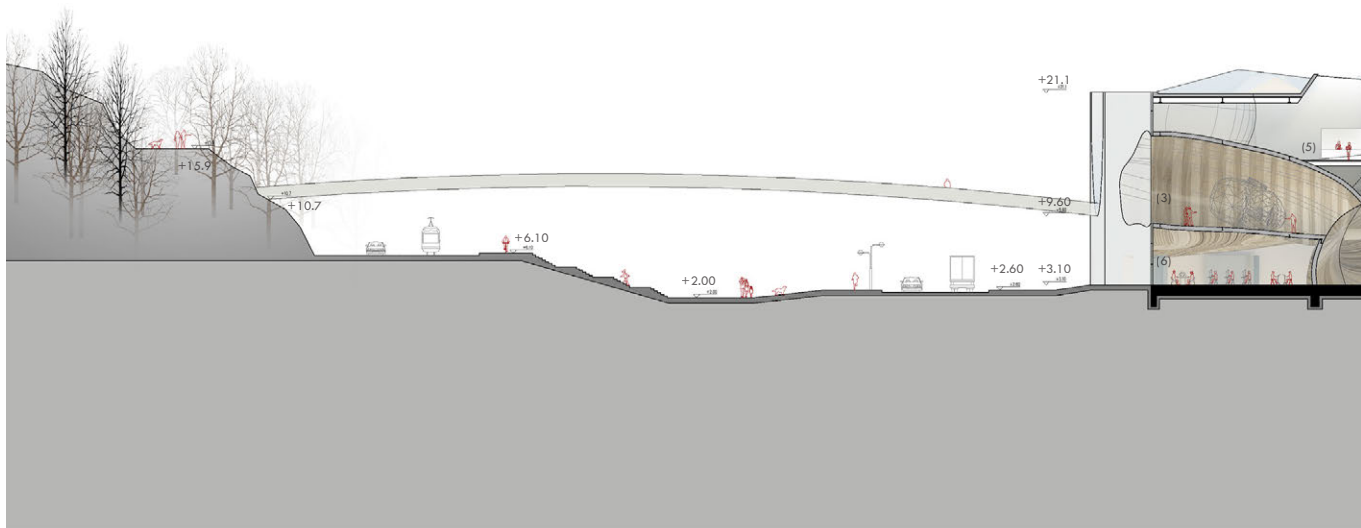


Figure 5.5.2 B-B Section Plan

- | | |
|------------------------|------------------------|
| 1 Tunnel Atrium | 6 Art Factory |
| 2 Workshop Space | 7 Exhibition Galleries |
| 3 Art Experience Space | 8 Museum Store |
| 4 Bookstore | 9 Sculpture Venue |
| 5 Design Market | |

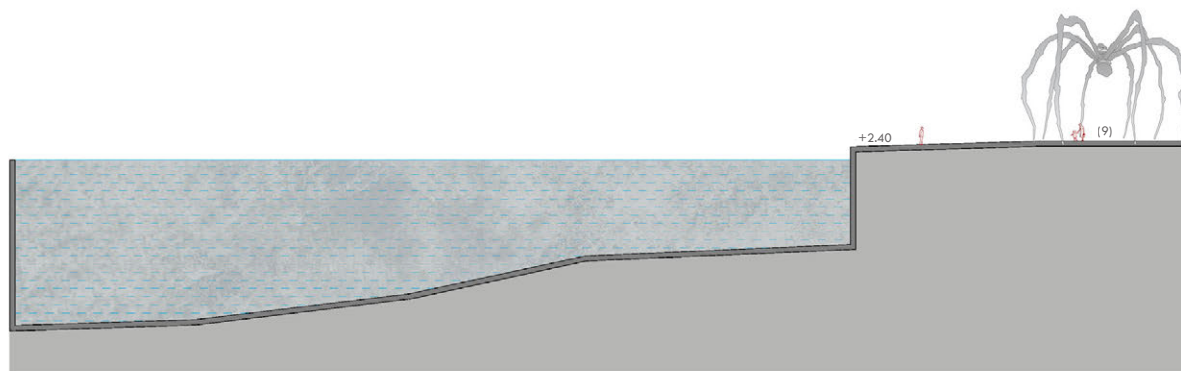
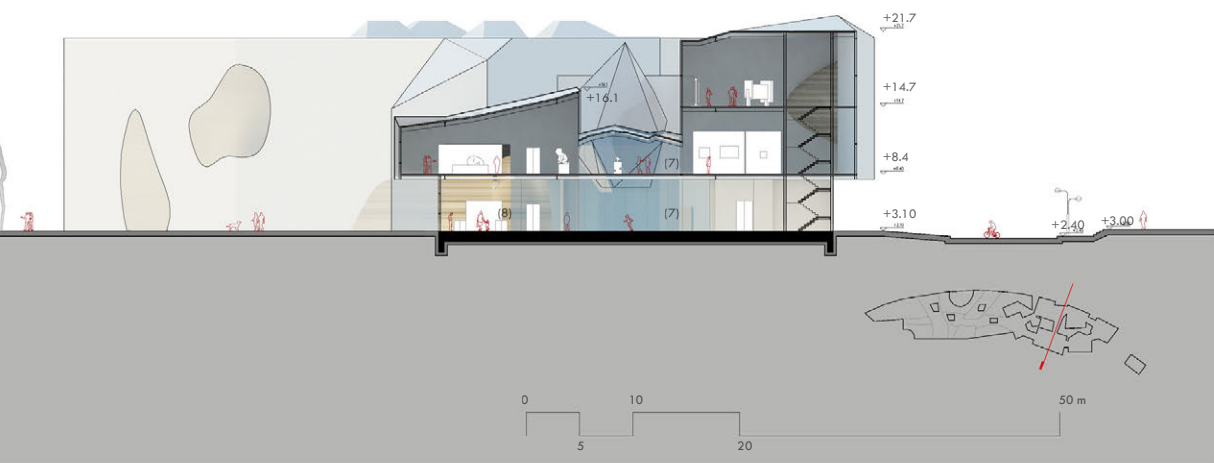
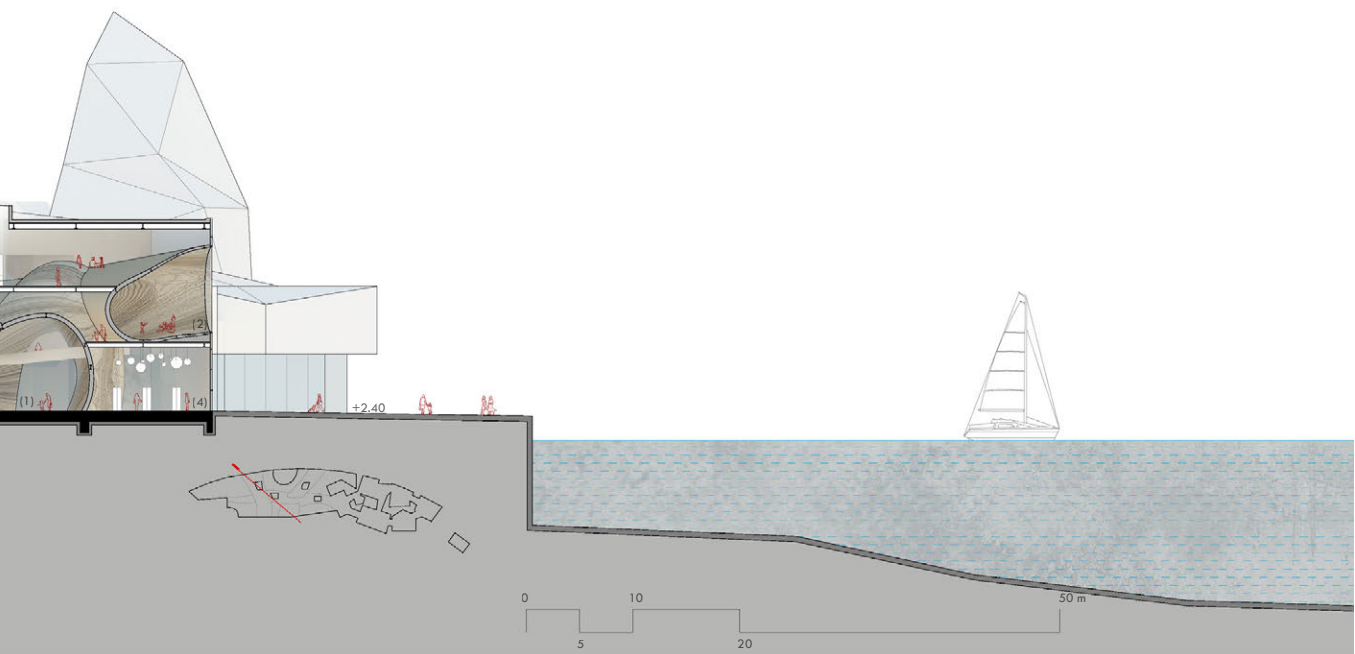
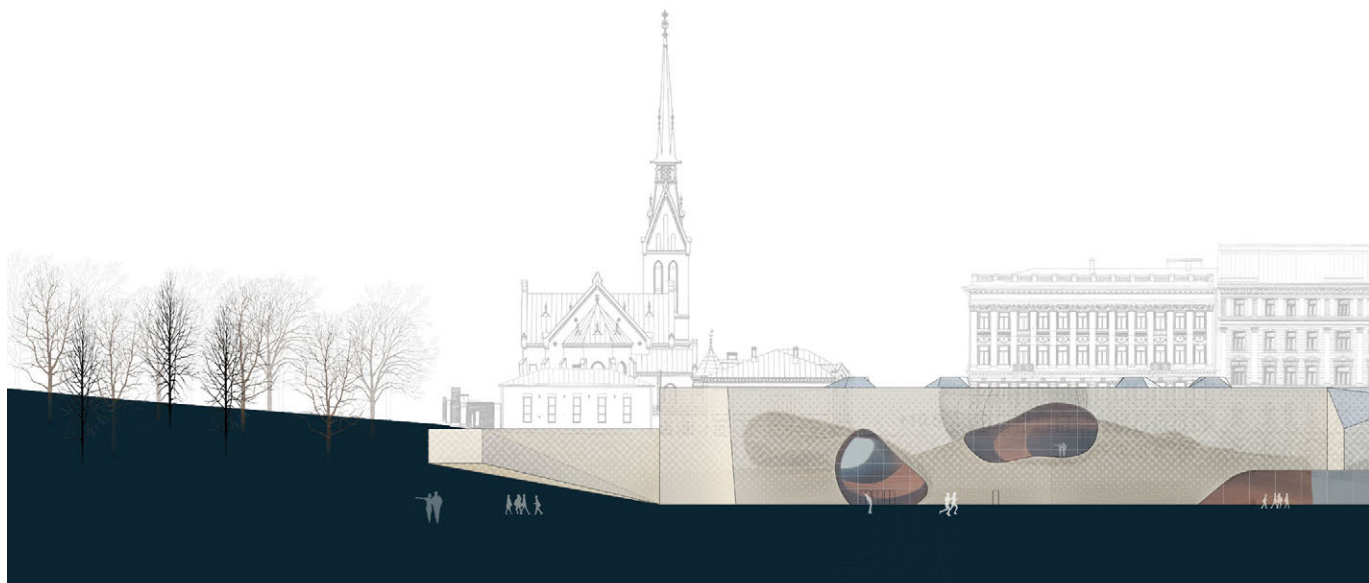


Figure 5.5.3 C-C Section Plan



5.6 Elevation Plan

The overall museum building is covered by the “white skin”, consisting of double glazing panes, some of them are marked with white pattern, while the others are keep pure transparent. Under the fickle weather, the whole museum is rendered into an iridescent crystal, whose expression following the changing reflection of the city, the water and the sky. There are several irregular openings shaped by the internal tunnels adding more fun elements on the façades. And their warm wooden color can be partly seen behind the translucent screen, which creates strong visual impact against the cold white exterior. Reversely, viewing from inside, these openings provide ever-changing urban and coastal scenes on different levels.



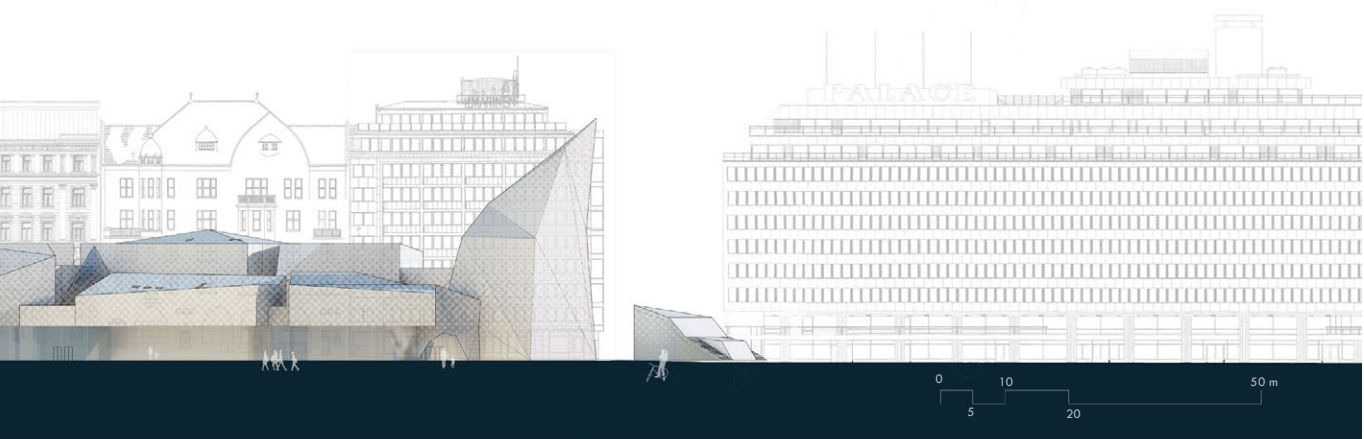


Figure 5.6.1 East Elevation



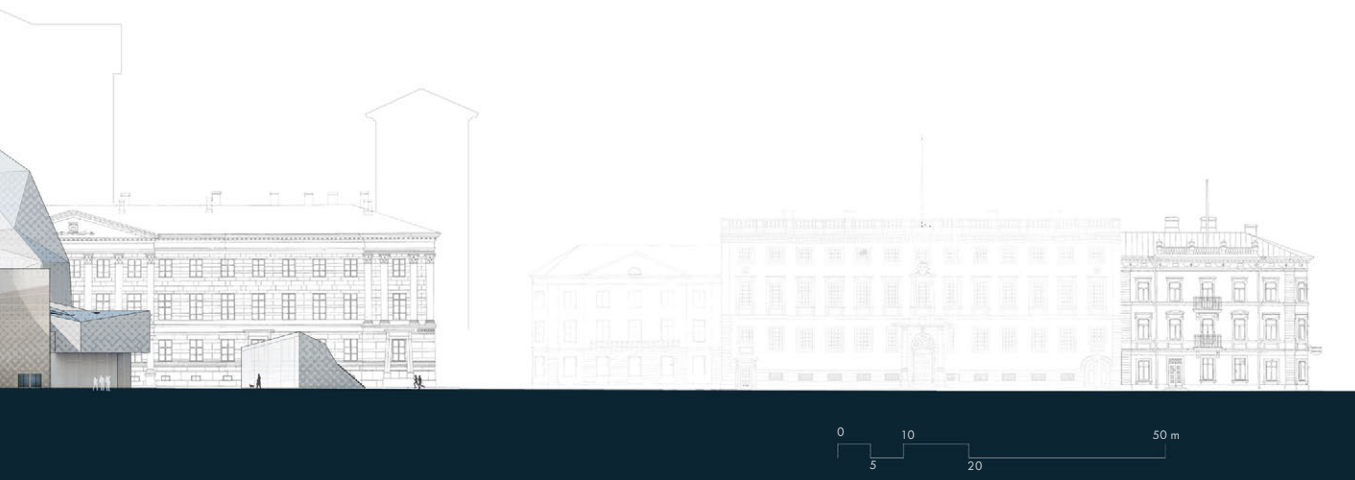


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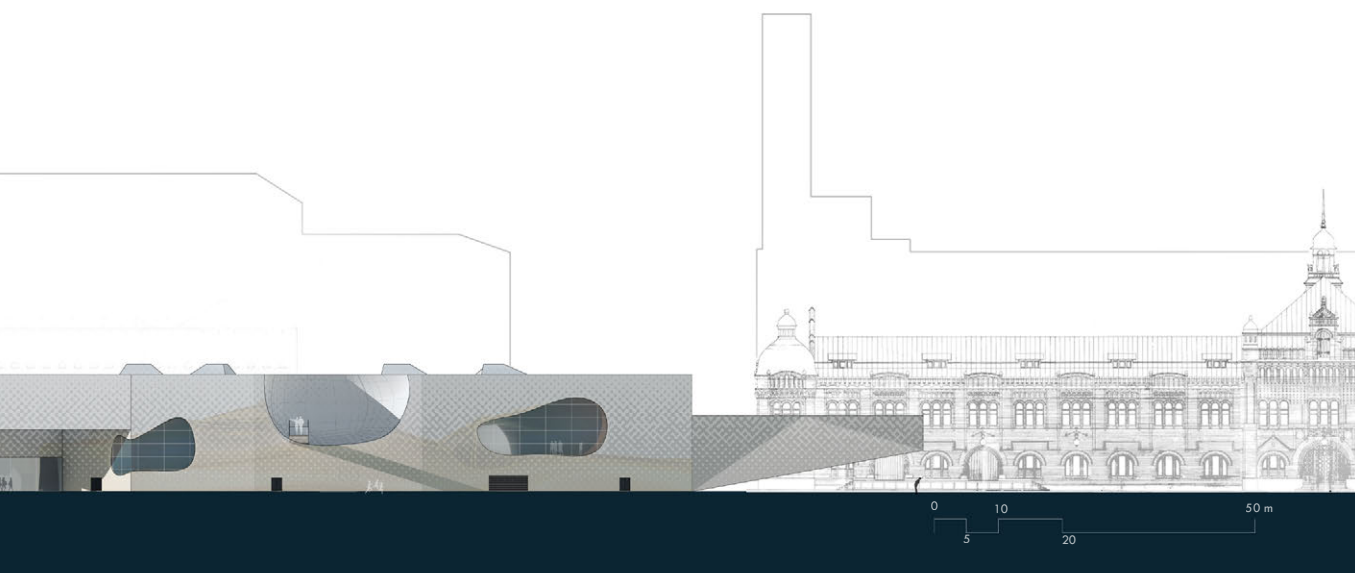


Figure 5.6.3 West Elevation

5.7 Detail Design

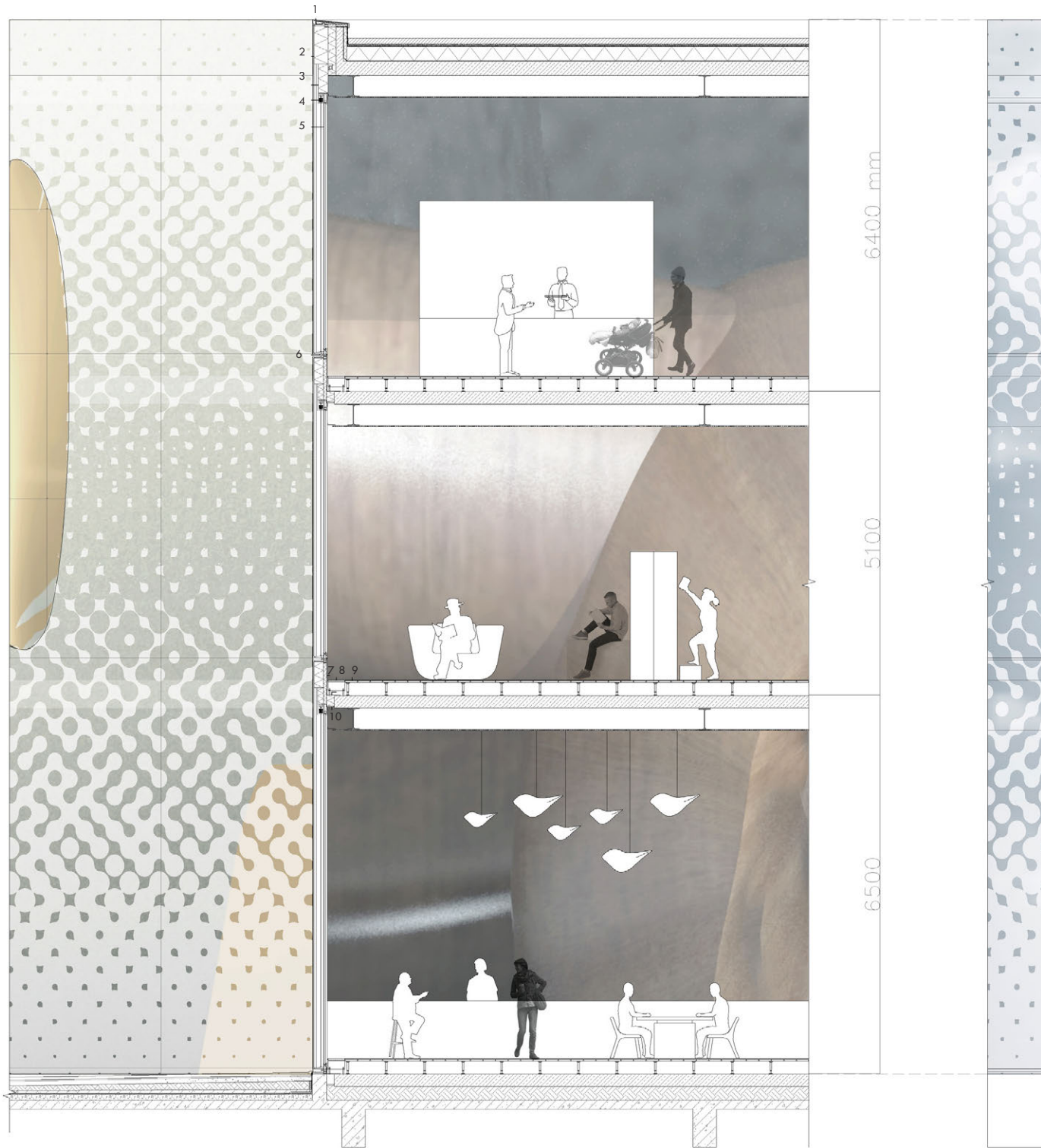
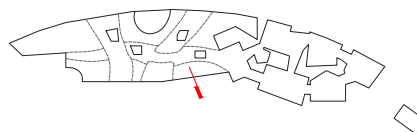


Figure 5.7.1 Detail Section Plan



The striking glazed façade is composed of thousands of storey-high modules (each measuring around two meters in width and six meters in height). Employing double glazing, a baffle plate is on the outermost surface, while in between the two are a self-cleaning, mechanical ventilation component and the solar protection. Most glass panels are silk-screened with white reflective dot pattern, preventing the structure from overheating and creating a shimmering effect at the same time.

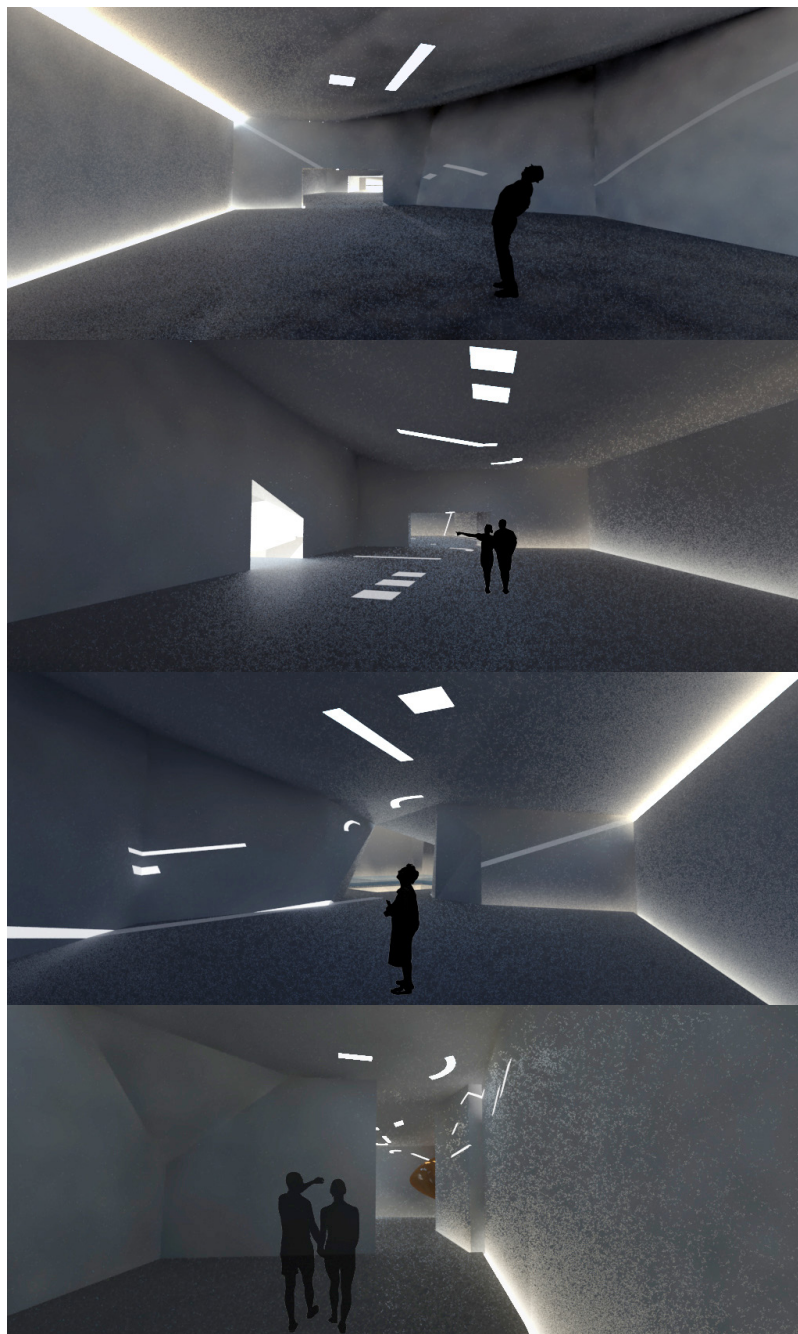
1. 3mm aluminum cap, powder-coated
2. Baffle plate: 12mm toughened glass partly transparent, partly silk-screened in white pattern
3. 160-290 mm insulating panel, aluminum, powder-coated in white color mineral-wool filling
4. Venetian blinds with cable control, aluminum, powder-coated in white pattern
5. Aluminum module façade double glazing, break resistant toughened glass +cavity+ laminated safety glass, partially thermal glazing
6. Incoming air vent in intermediate space
7. Fire protection panel
8. Floor convector
9. Carpet, raised floor, accessible for service
10. Sheet-steel connection



5.8 Light Analysis

Because of the glazing skin, there is no totally dark space in the museum. All the light source of display is from natural light during daytime. But if needed, the assembled dark boxes can be located anywhere on the flexible floor plan.

However, the white-pattern on the glazing can still block and control the amount of light into the room, to create gentle and uniform light effect. Daylight could also travel through the small slits on the roof. As the sun path changes seasonally, the light markings shift accordingly like dancing around the room.



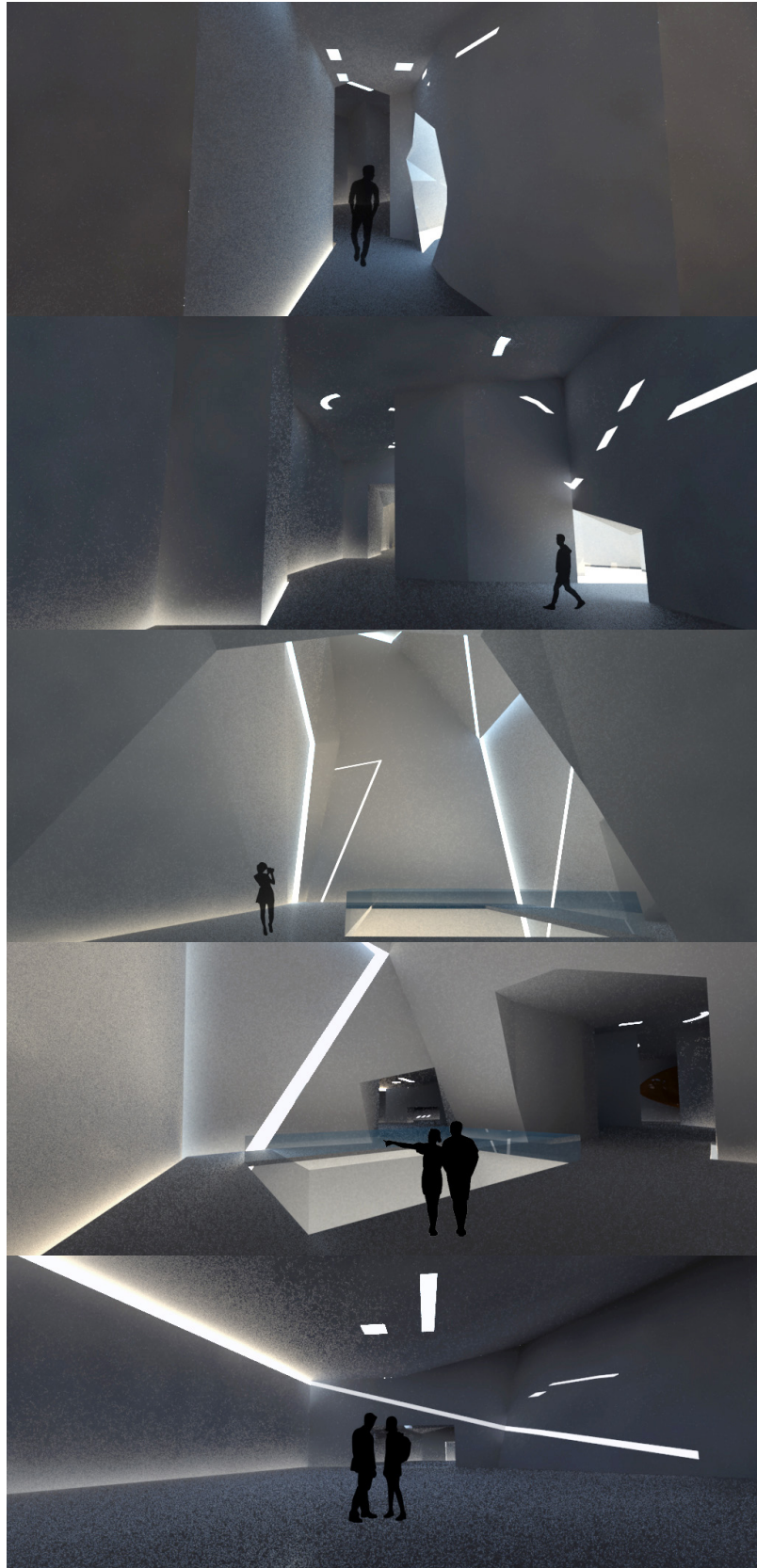
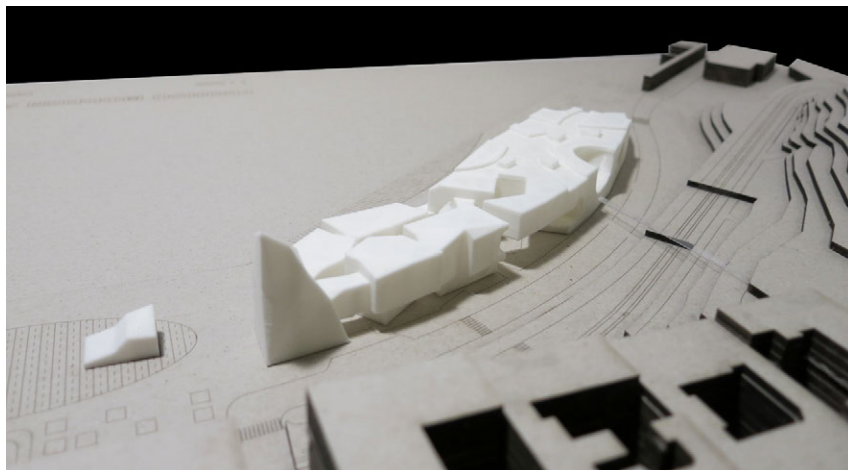
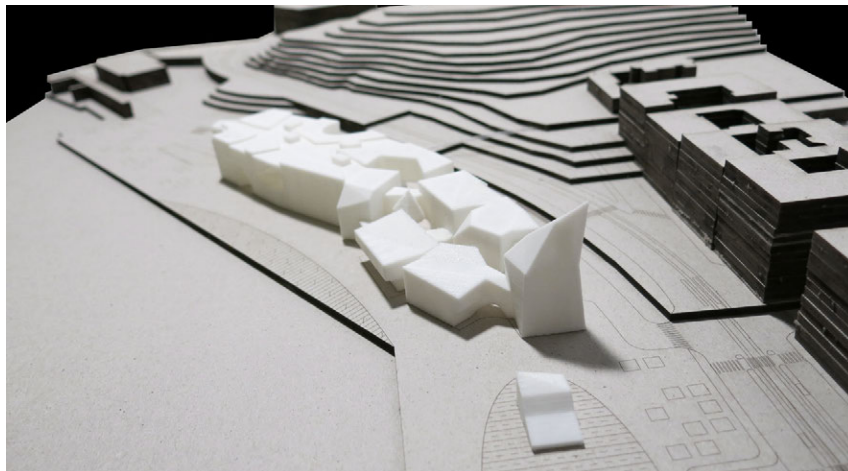
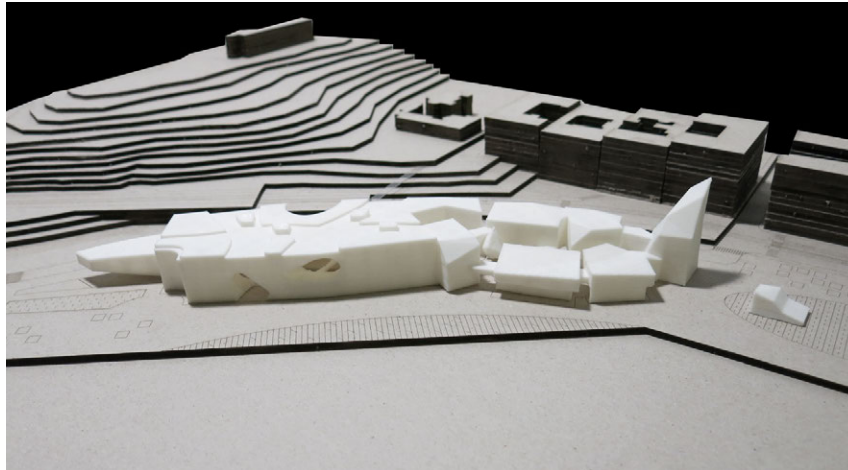


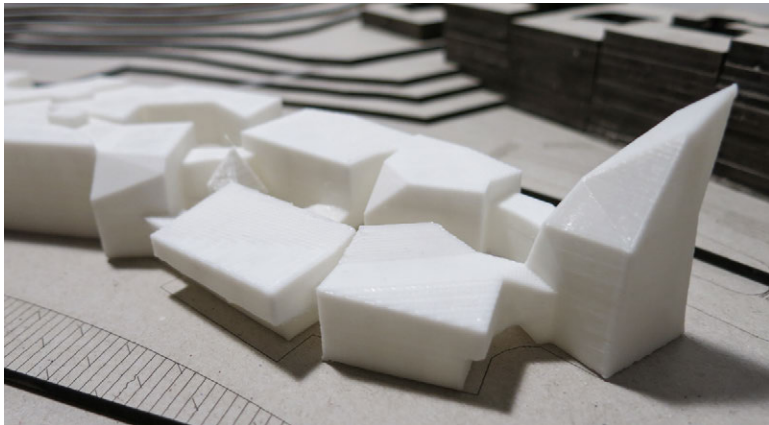
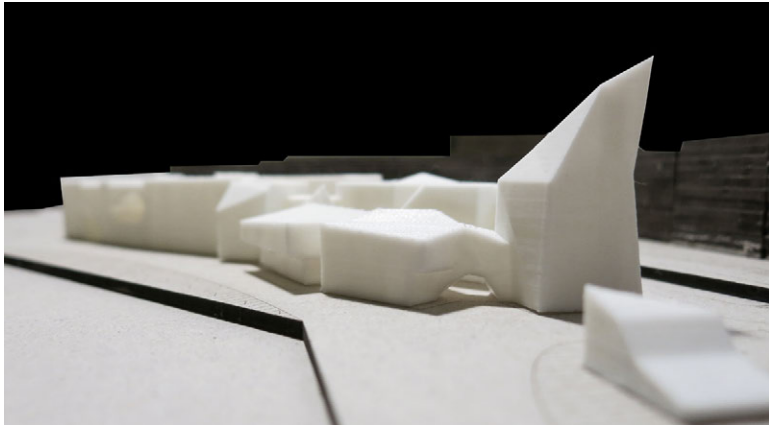
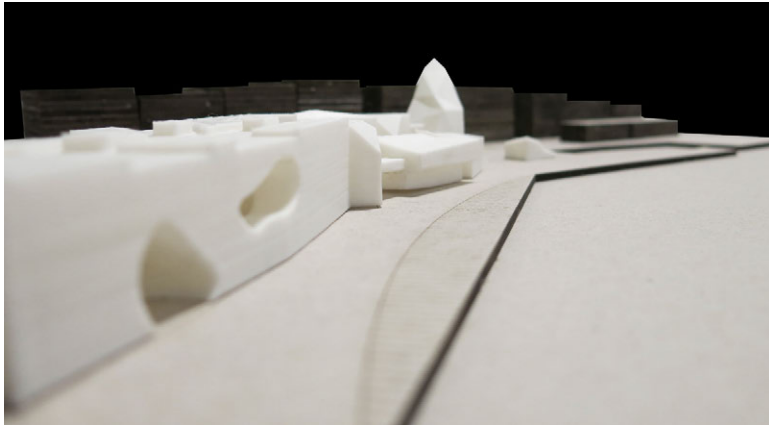
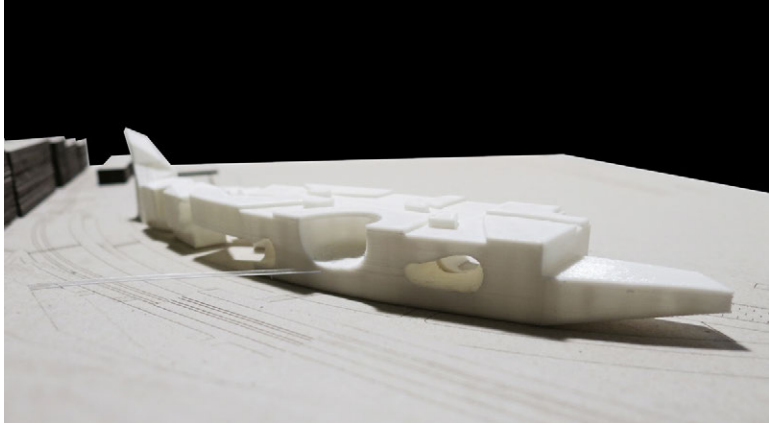
Figure 5.8.1 Light Study

5.9 Physical Model

The model of museum building is printed by Maker Bot Replicator in white. And the surrounding existing environment is cut by Epilog Laser Fusion 75W (work area 1016 mm x 711 mm) with gray cardboards (3 mm). The scale is 1:800.

Figure 5.9.1 Museum Model





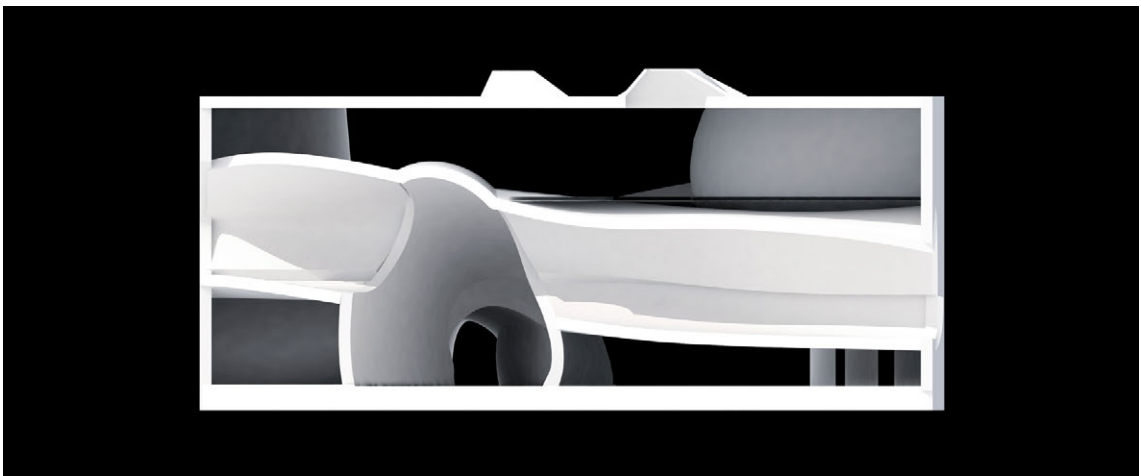
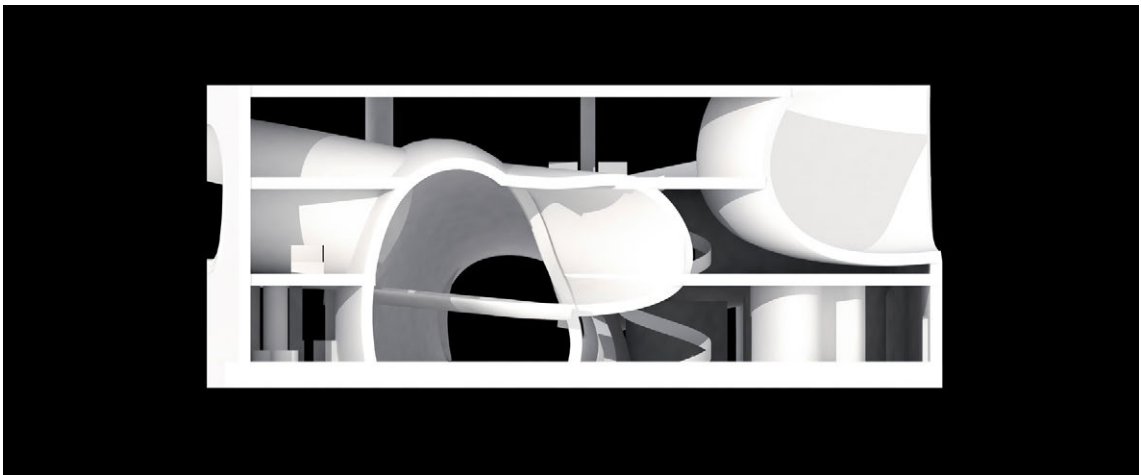
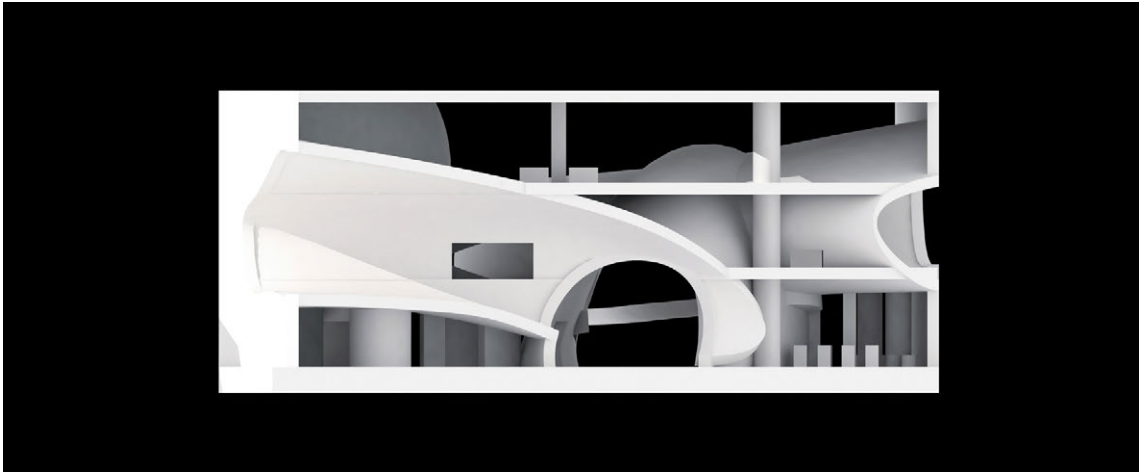
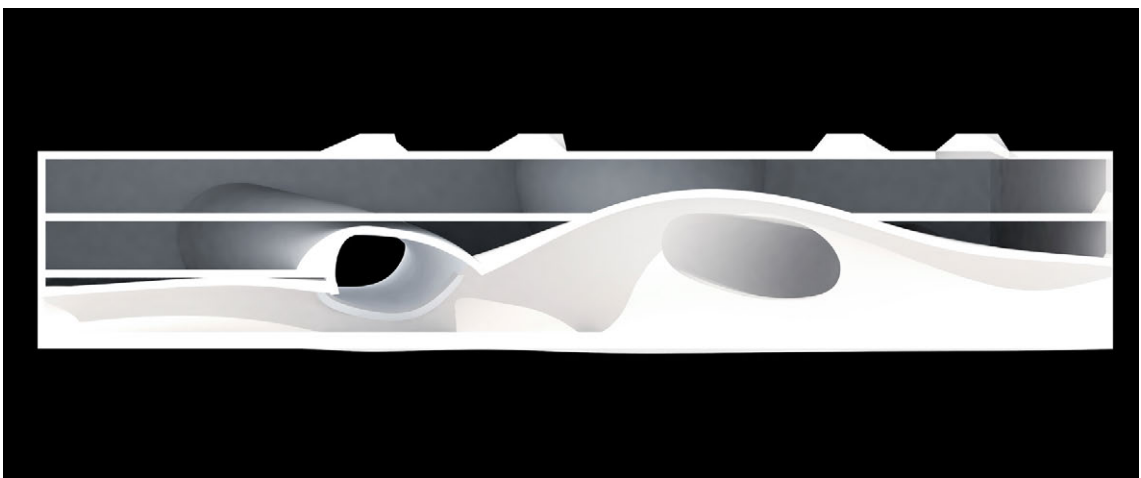
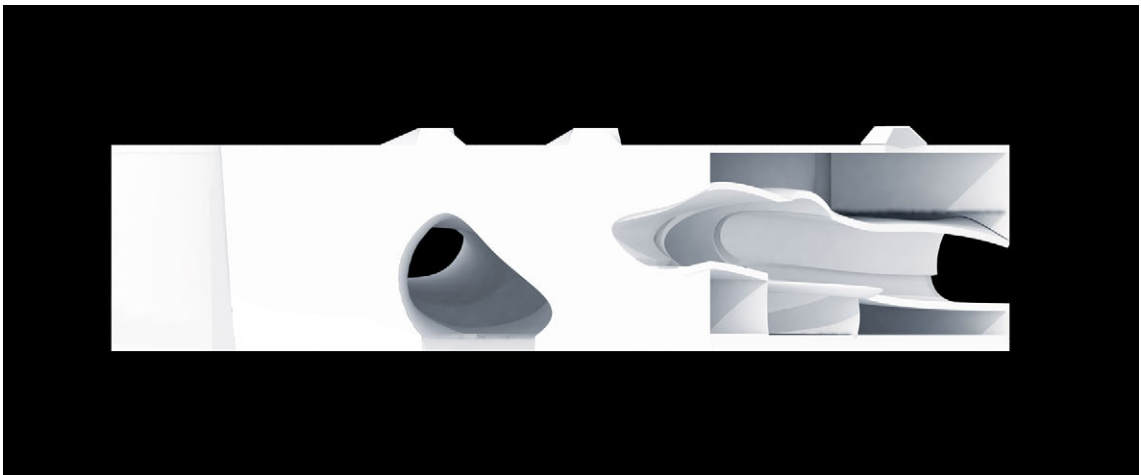
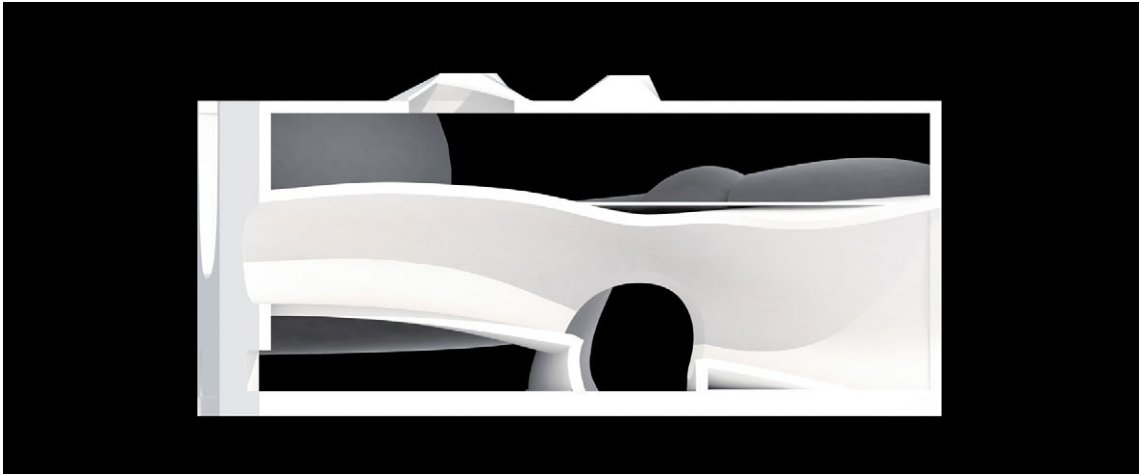


Figure 5.9.2 Section Model



06 / CONCLUSION

Conclusion

Modern museum, especially art museum, is one of the most noteworthy genres in the public domain. One can read the development in culture and architecture with particular clarity through museum buildings, as their tendencies are reflected quickly on the various unpredictable aspects of architecture. Thus, art museum becomes seismographs of public culture.

Through the investigation of the development of museum architecture, new trends in museum design is summarized as:

1. Museum is artistic in its own right and structure as attractor.
2. Space should be flexible not only in area and height, but also caters various events.
3. Public interests emphasize more on service consumptions like retail and restaurant.
4. Be a social condenser to mix, not abstruse Junkspace to isolate.
5. More events are taken place outside the museum wall and into the public realm.
6. Not only the way of display, but also the architecture interacts with visitors.

Based on the above analysis and the urban regeneration movement of Helsinki, a new modern art museum is designed. Starting from the urgent environmental issue of global warming and the rise of sea level, a 'melting iceberg' is created to accommodate extensive urban functions. It will vitalize the neighborhood of Eteläranta and a vibrant, international center for art lovers, a magnet for both tourists and the business world.



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